

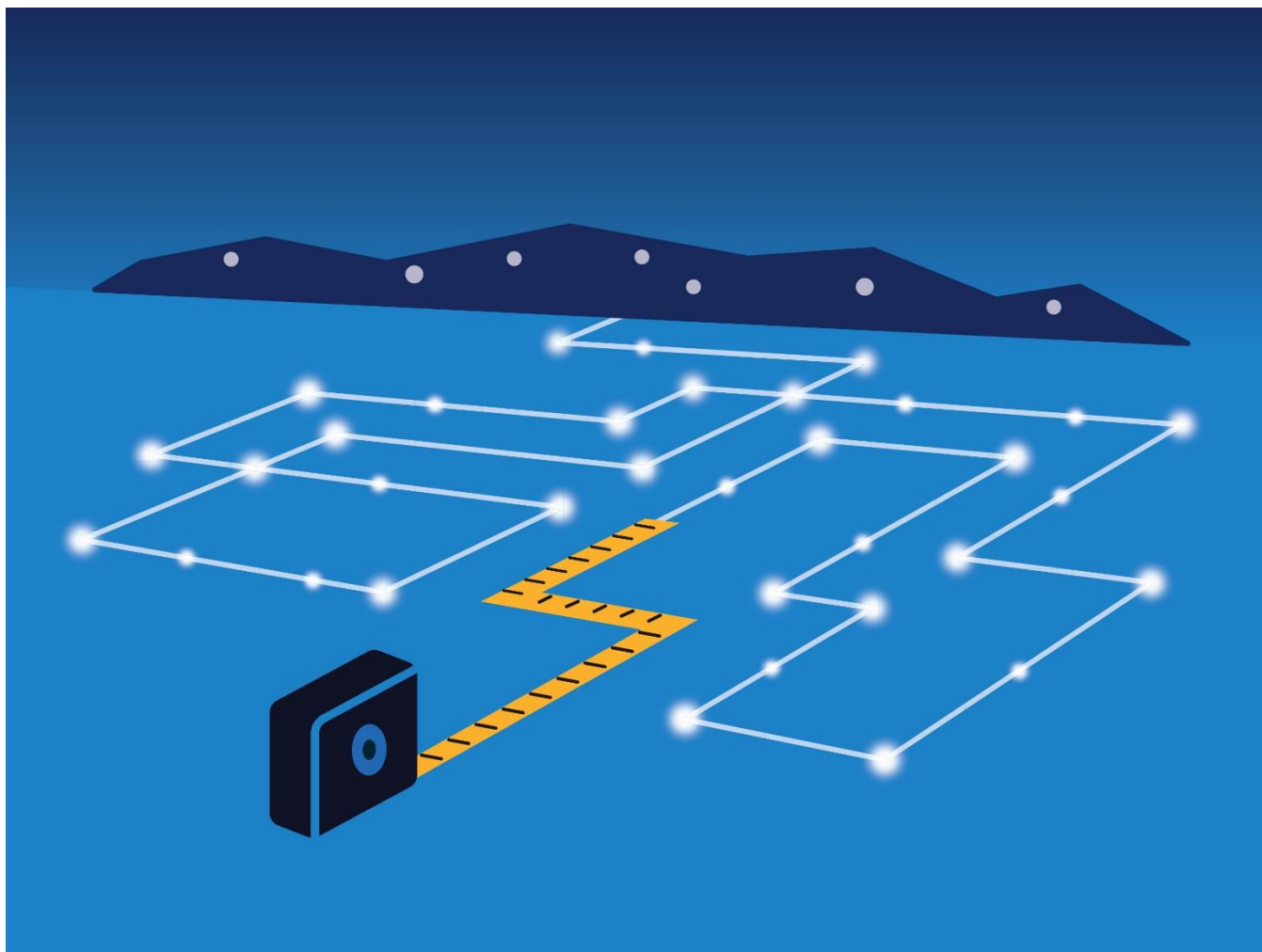


Opinion **Dynamics**

**Boston** | Headquarters

617 492 1400 tel  
617 497 7944 fax  
800 966 1254 toll free

1000 Winter St  
Waltham, MA 02451



# Duke Energy Carolinas

## Energy Efficient Appliances and Devices Program Final Evaluation Report

December 8, 2017



## **Contributors**

**Tami Buhr**  
Vice President, Opinion Dynamics

**Kessie Avseikova**  
Director, Opinion Dynamics

**Kai Zhou**  
Managing Consultant, Opinion Dynamics

**Brendon Donoghue**  
Associate Consultant, Opinion Dynamics

## Table of Contents

1. Evaluation Summary.....	1
1.1 Program Summary.....	1
1.2 Evaluation Objectives, Conclusions, and Recommendations.....	1
2. Program Description .....	5
2.1 Program Design .....	5
2.2 Program Implementation .....	5
2.3 Program Performance .....	6
3. Key Research Objectives .....	7
4. Overview of Evaluation Activities .....	8
5. Impact Evaluation .....	12
5.1 Methodology .....	12
5.2 Gross Impact Results .....	18
5.3 References.....	20
6. Net-to-Gross Analysis .....	21
6.1 Methodology .....	21
6.2 NTG Results .....	22
6.3 Net Impact Results.....	24
7. Process Evaluation.....	25
7.1 Methodology .....	25
7.2 Key Findings.....	25
8. Conclusions and Recommendations .....	35
8.1 Conclusions.....	35
8.2 Recommendations .....	36
9. Summary Form.....	38

## Table of Tables

Table 1-1. Summary of Gross Savings Inputs.....	2
Table 1-2. Overview of Program Impacts .....	3
Table 1-3. Per-Unit Ex Post Savings.....	3
Table 2-1. Summary of Program-Tracking Data for Program Period <sup>a</sup> .....	6
Table 4-1. Overview of Evaluation Research Activities .....	8
Table 4-2. Participant Survey Sample Sizes and Number of Completed Interviews by Sample Frame .....	10
Table 4-3. Participant Survey Disposition Summary .....	10
Table 4-4. Precision and Margin of Error at 90% Confidence .....	11
Table 5-1. Summary of Gross Savings Inputs.....	14
Table 5-2. Installation Trajectory .....	15
Table 5-3. Discount Rate Summary .....	15
Table 5-4. First-Year ISR.....	16
Table 5-5. DEC Cumulative Installation Rate Trajectory .....	16
Table 5-6. LED HOU and CF Assumptions.....	17
Table 5-7. Gross Impact Results .....	19
Table 5-8. Ex Post Total and Per-Bulb Gross Impacts .....	19
Table 6-1. NTG Results .....	23
Table 6-2. Net Impact Results for 2012–2015 Evaluation Period .....	24
Table 7-1. Participation by Program Phase.....	25
Table 7-2. Kit Size Distribution by Phase .....	26
Table 7-3. Participant Composition Analysis .....	27
Table 8-1. Overview of Program Impacts .....	36
Table 8-2. Per-Unit Ex Post Gross Savings .....	36



## Table of Figures

Figure 5-1. Installation Rate Components ..... 16

Figure 6-1. Breakdown of Free-Ridership Rates..... 23

Figure 7-1. Participation Trends over Time..... 26

Figure 7-2. Participant Lighting Awareness and Usage ..... 29

Figure 7-3. Pre-Program LED Saturation..... 29

Figure 7-4. Sources of Program Awareness..... 30

Figure 7-5. Program Participation Mode ..... 31

Figure 7-6. Cross-Program Awareness ..... 32

Figure 7-7. Cross-Program Participation ..... 32

Figure 7-8. Satisfaction with Shipping Timelines ..... 33

Figure 7-9. Satisfaction Ratings ..... 34

# 1. Evaluation Summary

## 1.1 Program Summary

Duke Energy Carolinas (DEC) launched the Energy Efficient Appliances and Devices program in 2010 with the goal of reducing energy consumption and peak demand through increased awareness and adoption of energy-efficient lighting technologies. The Free LED program is a distinct component of the Energy Efficient Appliances and Devices program and is the focus of this evaluation report. The free LED program launched in 2010 and is a free giveaway program. Historically, Duke Energy offered up to 15 free general service CFL products in a variety of wattages and package configurations to DEC customers as part of this program. In January 2016, the program product mix shifted from CFLs to LEDs. The transition from CFLs to LEDs occurred in three phases:

- **Phase 0 (January–April 2016)<sup>1</sup>:** As part of this phase, Duke Energy offered 6-bulb LED kits to active residential customers who had not received their free bulb limit of 15 energy-efficient bulbs from Duke Energy. These included new DEC customers. The program targeted a select number of these eligible customers by sending them a business reply card (BRC) that they could send back to request the bulbs.
- **Phase 1 (June 2016–Present):** As part of this phase, the Free LED ordering platform was launched, allowing all eligible customers to order kits of various sizes (3, 6, 8, 12, and 15 bulbs), depending on the number of bulbs ordered in the past. This phase is available to the same customer cohort as Phase 0. Customer ordering channels include a dedicated website page, an online services (OLS) portal where customers can be intercepted with a pop-up offer if eligible, and an interactive voice response (IVR) phone system.
- **Phase 2 (March 2017–Present):** As part of this phase, Duke Energy is targeting customers who reached or exceeded their free bulb limit through the various free lighting programs with orders over 5 years or more since order date. Customers have a choice of 6- and 12-bulb kits. As with Phase 1 customers, eligible Phase 2 customers are able to order via a platform that will be incorporated into the Duke Energy public website, an OLS, and an IVR.<sup>2</sup>

To ensure that only DEC customers receive the LEDs, customers must provide their account number or the phone number associated with their account, as well as last four digits of their social security number. Once requested, program bulbs are shipped to the billing address associated with the customer's account.

This evaluation effort is focused on the program period February 29, 2016 through April 28, 2017.

## 1.2 Evaluation Objectives, Conclusions, and Recommendations

This evaluation of the Free LED program includes process and impact assessments, and addresses several major research objectives:

- Assess program performance and estimate gross and net annual energy (kWh) and peak demand (kW) savings associated with program activity

<sup>1</sup> Note that while the last drop of business reply cards informing customers of the program occurred in April 2016, participant requests for program bulbs continued through November 2016.

<sup>2</sup> Note that this evaluation covers less than two months of Phase 2.

- Assess program implementation processes and marketing strategies and identify opportunities for improvement
- Understand participant lighting awareness, preferences, and purchasing behaviors, and obtain an insight into lighting market dynamics

To achieve these research objectives, the evaluation team completed a range of data collection and analytical activities, including interviews with program staff, a participant survey, program-tracking data analysis, a deemed savings review, an impact analysis, and an analysis of the survey results. Through the primary data collection, the evaluation team developed estimates of a first-year in-service rate (ISR) and net-to-gross ratio (NTGR). Table 1-1 provides an overview of the ex post gross savings parameters, the sample sizes used to develop those estimates, and the associated confidence and precision.

**Table 1-1. Summary of Gross Savings Inputs**

Estimate	Sample Size	Estimate	Relative Precision (at 90% Confidence)
First-year ISR*	180	59.9%	7%
NTGR	482	50%	8%

\* Note that, due to the timing of the research activities, first-year ISR estimate is based on the participants from Phase 0 and Phase 1, while the NTGR is based on Phase 1 and Phase 2 participants.

Between February 29, 2016 and April 28, 2017, the Free LED program distributed 3,074,086 LEDs by sending 258,720 kits to 251,168 DEC customers. The program achieved 96,396 MWh in ex post gross energy savings, 14.2 MW in ex post gross summer peak demand savings, and 6.9 MW in winter peak demand savings across the three phases. The program realized 112% of energy savings, 127% of summer peak demand savings, and 171% of winter peak demand savings. High realization rates are primarily a result of the program using lower baseline wattage assumptions<sup>3</sup>, first-year ISR, and coincidence factors when estimating savings for LEDs distributed during Phase 2 of the program.

While the overall ISR was high (91.1% for North Carolina and 91.0% for South Carolina), first-year ISR was low, at 59.9%. The low first-year ISR is driven primarily by the fact that customers were able to receive a large number of LEDs at once, up to 15 depending on the phase, and most took advantage of the offering and ordered the maximum number of bulbs allowable.

The overall program NTGR of 50% was low compared to the previous evaluation of this program, where CFLs were the program measure (84%)<sup>4</sup>, and is a likely result of increased customer knowledge of energy-efficient lighting products and their benefits and positive results of the previous Free CFL program interventions. Program participant composition was disproportionately skewed toward higher-income customers and customers with higher levels of educational attainment; both of these cohorts had higher free-ridership (FR) and consequently lower NTGRs.

<sup>3</sup> The program team used lower baseline wattage assumptions for Phase 2 participants to account for likely replacement of LEDs with CFLs.

<sup>4</sup> Opinion Dynamics Corporation. *Duke Energy Carolinas. Energy Efficient Appliances and Devices Program. Final Evaluation Report.* Prepared for Duke Energy Carolinas. November 2015.

After applying the program NTGR to the ex post gross savings, the program achieved 48,476 MWh in energy savings, 7.2 MW in summer peak demand savings, and 3.5 MW in winter peak demand savings. Table 1-2 provides a summary of the program's gross and net impacts overall and by phase.

Table 1-2. Overview of Program Impacts

Phase	Total Savings	Ex Ante Results	Ex Post Gross Results	Gross Realization Rate	Ex Post Net Results	Net Realization Rate
0	Bulbs	343,848	343,848			
	Energy savings (MWh)	10,836	10,782	100%	5,422	60%
	Summer peak demand savings (MW)	1.4	1.6	113%	0.8	68%
	Winter peak demand savings (MW)	0.5	0.8	152%	0.4	92%
1	Bulbs	2,265,652	2,265,652			
	Energy savings (MWh)	71,398	71,046	100%	35,728	60%
	Summer peak demand savings (MW)	9.2	10.5	113%	5.3	68%
	Winter peak demand savings (MW)	3.3	5.1	152%	2.6	92%
2	Bulbs	464,586	464,586			
	Energy savings (MWh)	4,115	14,568	354%	7,326	213%
	Summer peak demand savings (MW)	0.5	2.2	404%	1.1	243%
	Winter peak demand savings (MW)	0.2	1.0	542%	0.5	327%
Total	Bulbs	3,074,086	3,074,086			
	Energy savings (MWh)	86,349	96,396	112%	48,476	67%
	Summer peak demand savings (MW)	11.2	14.2	127%	7.2	77%
	Winter peak demand savings (MW)	4.0	6.9	171%	3.5	103%

Table 1-3 provides per-bulb ex post gross and net savings. As can be seen in the table, across all phases per-bulb ex post gross energy savings are 31.4 kWh and peak demand savings are 0.0046 and 0.0022 for summer and winter respectively. Per-bulb ex post net energy savings are 15.8 kWh and peak demand savings are 0.0023 and 0.0011 for summer and winter respectively across all phases.

Table 1-3. Per-Unit Ex Post Savings

Per-Bulb Savings	Ex Post Gross Savings	Ex Post Net Savings
Energy savings (kWh)	31.4	15.8
Summer peak demand savings (kW)	0.0046	0.0023
Winter peak demand savings (kW)	0.0022	0.0011

The program implementation processes ran smoothly and effectively, resulting in high levels of customer satisfaction with the program. Program-tracking data were complete and accurate. Instances of products mailed and installed outside of the DEC jurisdiction were minimal. Instances of participants receiving more than the phase-based maximum number of bulbs through the program were also minimal.



## Recommendations

We recommend that program administrators calculate future savings from the Free LED program using the recommended per-bulb energy and summer peak savings presented in Table 1-3 above.

To increase program efficacy, we recommend that the program deploys targeted marketing and outreach strategies aimed at increasing participation among lower-income customers and customers with lower levels of educational attainment, while also continuing to reach out to renters and younger customers. Those customer cohorts are less likely to be free-riders and the program therefore will be able to effect change in their lighting preferences and behaviors. Such targeting can be achieved by overlaying census data over the customer data and targeting customers in geographic units (such as census block groups) with higher shares of the desired segment.

To improve its first-year ISR and subsequently the overall ISR, we recommend that the program includes collateral in the bulb kits urging customers to install as many program LEDs as possible by replacing working, less-efficient bulbs in their homes.

## 2. Program Description

### 2.1 Program Design

Duke Energy Carolinas (DEC) launched the Energy Efficient Appliances and Devices program in 2010 with the goal of reducing energy consumption and peak demand through increased awareness and adoption of energy-efficient lighting technologies. The Free LED program is a distinct component of the Energy Efficient Appliances and Devices program and is the focus of this evaluation report. The free LED program launched in 2010 and is a free giveaway program. Historically, Duke Energy offered up to 15 free general service CFL products in a variety of wattages and package configurations to DEC customers as part of this program. In January 2016, the program product mix shifted from CFLs to LEDs. The transition from CFLs to LEDs occurred in three phases:

- **Phase 0 (January–April 2016)<sup>5</sup>:** As part of this phase, Duke Energy offered 6-bulb LED kits to active residential customers who had not received their free bulb limit of 15 energy-efficient bulbs from Duke Energy. These included new DEC customers. The program targeted a select number of these eligible customers by sending them a business reply card (BRC) that they could send back to request the bulbs.
- **Phase 1 (June 2016–Present):** As part of this phase, the Free LED ordering platform was launched, allowing all eligible customers to order kits of various sizes (3, 6, 8, 12, and 15 bulb), depending on the number of bulbs ordered in the past. This phase is available to the same customer cohort as Phase 0. Customer ordering channels include a dedicated website page, an online services (OLS) portal where customers can be intercepted with a pop-up offer if eligible, and an interactive voice response (IVR) phone system.
- **Phase 2 (March 2017–Present):** As part of this phase, Duke Energy is targeting customers who reached or exceeded their free bulb limit through the various free lighting programs with orders over 5 years or more since order date. Depending upon bulb quantities from previous orders greater than 5 years, customers may have a choice of 6- or 12-bulb kits. As with Phase 1 customers, eligible Phase 2 customers are able to order via a platform that will be incorporated into the Duke Energy public website, an OLS, and an IVR.<sup>6</sup>

To ensure that only DEC customers receive the LEDs, customers must provide their account number or the phone number associated with their account, as well as last four digits of their social security number. Once requested, program bulbs are shipped to the billing address associated with the customer's account.

This evaluation effort is focused on the program period February 29, 2016 through April 28, 2017.

### 2.2 Program Implementation

DEC manages the Free LED program and is responsible for marketing the program to its customers, receiving customer orders, and maintaining the program-tracking database. AM Conservation Group (AMC) implements the Free LED program on behalf of DEC and handles fulfillment of customer orders. More specifically, AMC

<sup>5</sup> Note that while the last drop of business reply cards informing customers of the program occurred in April 2016, participant requests for program bulbs continued through November 2016.

<sup>6</sup> Note that this evaluation covers less than two months of Phase 2.

handles packing, shipping, and tracking orders, as well as any shipment or product issues. AMC provides daily updates on fulfilled orders and monthly reports on performance metrics to DEC.

Free LED program marketing has been focused and phase-specific and included BRCs during Phase 0 and intercepts through OLS or direct mail during Phase 1 and Phase 2. DEC also offers a program-dedicated web page.

## 2.3 Program Performance

Between February 29, 2016 and April 28, 2017, AMC shipped 258,720 LED kits totaling 3,074,086 LEDs. Most of the packs shipped were 12-bulb or 15-bulb packs (86%). Program-estimated energy savings totaled 86,349 MWh. Table 2-1 provides a summary of shipments, bulbs, and energy and demand savings achieved during the program period.

Table 2-1. Summary of Program-Tracking Data for Program Period<sup>a</sup>

Kit Type Mailed	Kits Mailed	Bulbs Mailed	Ex Ante Gross Savings (MWh)	Ex Ante Gross Summer Coincident Savings (MW)	Ex Ante Gross Winter Coincident Savings (MW)
Phase 0	57,308	343,848	10,836	1.40	0.51
Phase 1	161,300	2,265,652	71,398	9.25	3.34
Phase 2	40,112	464,586	4,115	0.53	0.19
<b>Total</b>	<b>258,720</b>	<b>3,074,086</b>	<b>86,349</b>	<b>11.18</b>	<b>4.04</b>

<sup>a</sup> Savings may not add due to rounding.

### 3. Key Research Objectives

This evaluation of the Free LED program includes process and impact assessments and addresses several major research objectives:

- Assess program performance and estimate gross and net annual energy (kWh) and peak demand (kW) savings associated with program activity
- Assess program implementation processes and marketing strategies and identify opportunities for improvement
- Understand participant lighting awareness, preferences, and purchasing behaviors, and obtain an insight into lighting market dynamics

This evaluation provides DEC with results required by the North Carolina Utilities Commission and the Public Service Commission of South Carolina. The results also provide inputs for system planning and future program design and delivery.

The North Carolina Utilities Commission requires the following for the evaluation of DEC's Free LED program:

- That DEC uses Carolinas-specific, both North and South Carolina, data in future evaluation, measurement, and verification (EM&V) reports
- That future EM&V reports include a discussion of the impacts of LEDs, 2007 Energy Independence and Security Act (EISA), and other innovations in lighting technology and relevant regulatory mandates on the calculations of measure impacts and the baseline measures used in those calculations

This evaluation satisfies commission requirements and provides certain Carolinas-specific updated inputs into savings calculations. The evaluation also provides process and market information that DEC can use to further tailor the Free LED program to a rapidly changing lighting market.

As part of the process assessment, we explored the following research questions:

- What are the sources of program information?
- How effective are the program implementation and data-tracking practices?
- Are participants satisfied with their program experiences?
- How effective are the program's marketing, outreach, and educational tactics?
- What is the program reach? What percentage of DEC's customer base has participated in the program?
- What customer segments should the program target to minimize free-ridership (FR)?
- What are the strengths, weaknesses, and opportunities for program improvement?
- What are participant lighting preferences and purchase behaviors?

## 4. Overview of Evaluation Activities

To answer the research questions outlined in the previous section, the evaluation team performed a range of data collection and analytical activities. Table 4-1 provides a summary of evaluation activities and associated areas of inquiry. Following the table, we provide detail on each activity's scope, sampling approach (if applicable), and timing of the activity.

Table 4-1. Overview of Evaluation Research Activities

#	Evaluation Activity	Impact	Process/ Market	Purpose of Activity
1	Program staff interviews		X	<ul style="list-style-type: none"> <li>• Provide insight into program design and delivery</li> <li>• Support process assessment</li> </ul>
2	Materials review	X	X	<ul style="list-style-type: none"> <li>• Provide insight into program design and delivery</li> <li>• Inform previously used and alternative savings assumptions</li> </ul>
3	Deemed savings review	X		<ul style="list-style-type: none"> <li>• Review accuracy and appropriateness of energy savings assumptions and determine alternative savings inputs</li> </ul>
4	Impact analysis	X		<ul style="list-style-type: none"> <li>• Calculate gross and net energy and demand savings</li> </ul>
5	Participant survey	X	X	<ul style="list-style-type: none"> <li>• Estimate in-service rate (ISR)</li> <li>• Estimate FR and spillover (SO)</li> <li>• Assess lighting market</li> <li>• Support process assessment</li> </ul>

### 4.1.1 Program Staff Interviews

The evaluation team completed one interview with program staff at Duke Energy, in June 2016. The interview explored changes in program design and implementation, program performance, incentivized product specifications, and data tracking and communication processes, among other topics.

### 4.1.2 Materials Review

In support of the impact and process evaluations, the evaluation team reviewed program materials and data, including marketing materials, plans, and past evaluation reports and research studies. This information informed our research design, provided insight into program design and delivery, and supported the assessment of program impacts.

### 4.1.3 Deemed Savings Review

In support of the impact evaluation, the evaluation team reviewed program-tracking databases and energy savings assumptions. The objectives of the review were to identify the deemed savings values DEC used to calculate impacts; review the deemed savings values for reasonableness; verify their accurate application; and identify data gaps, omissions, inconsistencies, and errors.

To assess the reasonableness of the savings assumptions, we reviewed evaluation reports from previous evaluations of the Free CFL program, as well as other residential lighting programs that Duke Energy

administers in the Carolinas.<sup>7</sup> We also drew on the primary research completed as part of the DEC's Retail LED program evaluation.<sup>8</sup> Finally, we consulted evaluation reports and Technical Reference Manuals (TRMs) from other jurisdictions.

As part of the deemed savings review process, we also checked program-tracking data for accuracy, consistency, and completeness.

#### 4.1.4 Impact Analysis

The impact analysis included calculating ex post gross and net program savings using updated savings assumptions. We calculated savings using the Uniform Methods Project (UMP) protocols recommended approach.

#### 4.1.5 Participant Survey

The evaluation team completed a mixed-mode (telephone and online) survey with a representative sample of DEC Free LED program participants. The key goals of the survey were to gather information to support the assessment of gross impacts, program attribution, program processes, and market dynamics. Specifically, we used the survey results to produce updated estimates of the first-year ISR, FR, SO, lighting knowledge and preferences, and participant experiences with the program.

#### Sample Design and Fielding

For most customers, lighting products are a low-cost and low-importance purchase. Therefore, when using the self-report method to estimate program FR, it is best to conduct interviews with participants as close to their participation as possible to facilitate accurate recall of the factors that affect bulb purchase or order decisions. On the other hand, it is best to let some time pass when measuring SO effects and first-year ISR so that participants have time to install the products and take additional program-induced actions.

To address these competing priorities, Opinion Dynamics conducted the participant survey in waves and staggered the timing of the interviews based on the survey objective. We drew one sample from the most recent participants to assess program processes and to estimate FR and a separate sample from earlier participants to estimate SO and ISR. The phased approach to survey administration is more accurate than if we relied just on the most recent participants and extrapolated the results to all participants regardless of when they participated.<sup>9</sup>

We completed a total of three waves of the participant survey equally timed over the course of the program period. We administered the first wave between December 2016 and January 2017, the second wave between March 2017 and April 2017, and the third wave between May 2017 and June 2017.

For each wave, we used two distinct sample frames from which we drew a random sample of program participants. The sample frame used to estimate FR and program processes included customers who participated in the program in the 3 months prior to the survey. The sample frame used to estimate SO and ISR included customers who participated in the program between 3 months and 6 months prior to the survey

<sup>7</sup> These programs include the Duke Energy Progress (DEP) Energy Efficient Lighting (EEL) program and the DEC Online Store program.

<sup>8</sup> The DEC Retail LED report is undergoing review as of the writing of this report.

<sup>9</sup> Duke Energy anticipates to apply the evaluated (ex post) energy and demand savings values starting in May, 2017. The timing of the participant surveys (mostly in 2017) should provide an adequate perspective on the LED installation patterns and decision making processing of 2017 participants overall.

fielding date. Due to the timing of the survey efforts, the FR sample included almost exclusively participants from Phases 1 and 2, while the SO and ISR sample only included Phase 0 and Phase 1 participants.

We completed a total of 482 interviews over the course of the three waves. Overall, 304 interviews supported the assessment of FR and program processes and 178 interviews supported the assessment of SO and ISR.

**Table 4-2. Participant Survey Sample Sizes and Number of Completed Interviews by Sample Frame**

Sample Frame	Sample Frame Size	Sample Size	Number of Completed Interviews
FR	185,058	1,257	304
SO	92,217	943	178
<b>Total</b>	<b>225,182</b>	<b>2,200</b>	<b>482<sup>a</sup></b>

<sup>a</sup> Please note that nine additional participants completed the survey but did not receive either the FR or SO modules. Those participants did not verify their participation in the program. Their responses are used in our calculation of the ISR only.

We sent participants either mail or email invitations and reminders to take the survey depending on the availability of email addresses; participants could choose to take the survey online or call our phone center to take it over the telephone. Participants who did not have an email address on file received an invitation letter and two postcard reminders in the mail, while participants with email addresses received invitations and reminders via email. To increase response rates, we offered participants incentives in the form of several cash prize drawings.

### Survey Dispositions and Response Rate

Table 4-3 provides the final survey dispositions.

**Table 4-3. Participant Survey Disposition Summary**

Disposition	Count
<b>Completed Interviews (I)</b>	<b>482</b>
Internet survey complete	463
Phone survey complete	19
<b>Partial Interviews (N)</b>	<b>43</b>
<b>Household with Undetermined Survey Eligibility (U1)</b>	<b>1,659</b>
Partial complete - survey eligibility unknown	26
Answering machine	8
Not available	2
Language problems	1
Non-specific callback	1
Initial refusal	4
No response	1,617
<b>Undetermined if eligible household</b>	<b>1</b>
No answer	1
<b>Survey-ineligible household</b>	<b>10</b>
Known ineligible (screened out)	10

Disposition	Count
Not an eligible household	5
Bounced email	5
<b>Total Participants in Sample</b>	<b>2,200</b>

We calculated response rates using the Response Rate 3 (RR3) methodology specified by American Association of Public Opinion Research (AAPOR). We achieved a 22% survey response rate. We do not report a cooperation rate, because it is difficult to estimate it accurately with mailed and emailed survey invitations. The cooperation rate is the proportion of participants who *completed* the survey out of all eligible participants *contacted*. While we recorded returned mail invitations and bounce-back email invitations, we cannot say with certainty that the ones that were not returned were received and opened by qualified participants. Therefore, we do not have an accurate number of eligible contacted participants to calculate a cooperation rate.

### Survey Data Weighting

The survey sample resembled the participant population across a range of known participant characteristics; therefore, there was no need to apply post-stratification weights.

### Targeted and Achieved Confidence and Precision

The evaluation targeted 10% precision at a 90% confidence level for all data collection tasks that involved sampling. These precision goals were met (Table 4-4).

Table 4-4. Precision and Margin of Error at 90% Confidence

Metric of Interest	Relative Precision (At 90% Confidence)
First-year ISR	7%
Net-to-gross ratio (NTGR)	8%



## 5. Impact Evaluation

This section describes the methodology for conducting the gross impact analysis and the results of the analysis. The evaluation team completed the following activities:

- Reviewed program-tracking data and savings assumptions for accuracy, completeness, and consistency
- Conducted engineering analysis of energy and demand savings and developed ex post gross savings estimates based on the Uniform Methods Project (UMP)

### 5.1 Methodology

The evaluation team reviewed reported savings assumptions and verified that the algorithms and inputs used to calculate those assumptions were in line with the previous evaluation's recommendations.

As part of the impact evaluation, we conducted a deemed savings review through which we identified the deemed savings values that DEC used to calculate program savings; reviewed the deemed savings values for reasonableness; verified their accurate application; and identified data gaps, omissions, inconsistencies, and errors. As part of the deemed savings review process, we also checked program-tracking data for accuracy, consistency, and completeness.

To assess the reasonableness of the savings assumptions, we reviewed evaluation reports from previous evaluations of the Free CFL program, as well as other residential lighting programs that Duke Energy administers in the Carolinas. We also drew on the primary research completed as part of the DEC's Retail LED program evaluation. Finally, as part of our review, we consulted evaluation reports and TRMs from other jurisdictions.

Using data collected as part of the participant survey, we developed an updated estimate of the first-year ISR.

We estimated savings using the UMP protocols recommended approach. Per the UMP protocols, energy savings calculations include delta watts and ISR. Equation 5-1 provides the formula that we used to estimate energy savings, while

Equation 5-2 provides the formula that we used to estimate demand savings.

Many upstream lighting programs<sup>10</sup> also account for leakage of discounted products outside of the utility service territory and for installation of program-discounted lighting in commercial applications. Leakage results in decreased savings, whereas installations in commercial applications lead to higher savings. Unlike upstream residential lighting programs that oftentimes have little control over who purchases discounted lighting products, DEC's Free LED program tightly controls who receives program LEDs and where customers can receive their LEDs, thus making leakage to non-DEC customers and installations in commercial applications unlikely. We explored the incidence of leakage and commercial installations through the participant survey and found that both are minimal (see Section 7.2.1 of this report). Therefore, we chose not to revise the equation to add a separate adjustment factor for leakage. However, we did account for program bulb leakage outside of the DEC service territory as part of the ISR by removing these bulbs from the installed base. This resulted in only a negligible change to ISR. We also did not apply a separate set of savings

<sup>10</sup> Upstream lighting programs provide incentives to retailers and manufacturers who, in turn, pass them on to customers in the form of price markdowns.

assumptions to account for installations in commercial applications because of the minimal number of bulbs installed in such applications.

Equation 5-1. Algorithm for Energy Savings

$$\Delta kWh = ISR * \frac{(Watts * HOU)_{base} - (Watts * HOU)_{ee}}{1,000} * 365 * (1 + HVAC_c)$$

Equation 5-2. Algorithm for Peak Demand Savings

$$\Delta kW = ISR * \frac{Watts_{base} - Watts_{ee}}{1,000} * CF * (1 + HVAC_d)$$

Where:

- $\Delta kWh$  = first-year electric energy savings
- $\Delta kW$  = peak electric demand savings
- $ISR$  = in-service rate
- $Watts_{base}$  = Baseline wattage
- $Watts_{ee}$  = Efficient bulb wattage
- $HOU$  = residential annual operating hours
- $CF$  = peak coincidence factor
- $HVAC_c$  = HVAC system interaction factor for energy
- $HVAC_d$  = HVAC system interaction factor for demand

Table 5-1 presents a summary of the inputs used to calculate program gross energy and demand impacts and specifies the sources of the inputs. Following the table, we detail the source(s) behind each input and the rationale for the input selection. For reference purposes, Table 5-1 also provides savings assumptions used to estimate ex ante energy and demand savings.

Table 5-1. Summary of Gross Savings Inputs

Assumption	Program Phase	Ex Ante Assumption	Ex Post Assumption	Ex Post Assumption Source
ISR	All Phases <sup>a</sup>	90.2%	91.1% (NC) 91.0% (SC)	<ul style="list-style-type: none"> <li>Free LED Participant Survey for first-year ISR</li> <li>PY2013 Evaluation of the DEP EEL program for installation trajectory (Also consistent with the UMP)</li> <li>DEC-specific discount rates to discount future savings</li> </ul>
Baseline Wattage	0-1	47.7	43	2016 DEC Shelf Audit completed as part of the DEC Retail LED program evaluation <sup>b</sup>
	2	18.6		
LED Wattage	All Phases	9.0	9	Actual wattage
Average Daily Hours of Use (HOU)	All Phases	2.92	2.88	2016 DEP-DEC Residential Lighting Logger study completed as part of the DEC Retail LED program <sup>a</sup> and DEP EEL program evaluations
Summer CF	All Phases	0.114	0.128	
Winter CF	All Phases	0.096	0.145	2012 DEC Smart \$aver Program Evaluation
HVAC <sub>c</sub>	All Phases	-0.037	-0.037	
HVAC <sub>d</sub> – Summer	All Phases	0.168	0.168	PY2012 DEP EEL program evaluation
HVAC <sub>d</sub> – Winter	All Phases	-0.500	-0.500	

<sup>a</sup> Note that the first-year ISR estimate is based on Phase 0 and Phase 1 participants and excludes Phase 2 participants.

<sup>b</sup> As of the writing of this report, the Retail LED program evaluation report is undergoing review.

## In-Service Rate

Although the first-year ISR is generally less than 100%, research studies across the country have found that customers eventually install nearly all bulbs received through a lighting program. Approaches to claiming savings from these later installations vary and include staggering the claiming of savings over time and claiming the savings from all expected installations in the program year but discounting them by a societal or utility discount rate. While the “staggered” approach allows program administrators to more accurately capture the timing of the realized savings, the “discounted” savings approach allows for simplicity of claiming all costs and benefits during the program year and eliminates the need to keep track of and claim savings from future installations. We chose to use the “discounted” savings approach for this evaluation.

To allocate installations over time, we used the installation trajectory from the recently completed lighting storage log study conducted for DEP (discussed as part of the 2013 evaluation report of DEP Energy Efficient Lighting Program<sup>11</sup>). This study is the most recent and Carolina’s specific effort and is therefore appropriate for use. Furthermore, the installation rate trajectory from this study is recommended for use in the UMP. The DEP study estimates that participants install 97% of bulbs within 4 years of purchase. Table 5-2 presents the approach to developing installation rates over the 4 years following purchase based on the study.

<sup>11</sup> Navigant Consulting, Inc. and Apex Analytics, LLC. *EM&V Report for the 2013 Energy Efficient Lighting Program*. Prepared for Duke Energy Progress. August 13, 2014.

Table 5-2. Installation Trajectory

Year	Installation Trajectory Formula
Year 1	First-Year ISR
Year 2	$((1 - \text{First-Year ISR}) * 41\%) + \text{First-Year ISR}$
Year 3	$((1 - \text{First-Year ISR}) * 69\%) + \text{First-Year ISR}$
Year 4	97%

We estimated the first-year ISR through the participant survey and discounted future savings by the utility discount rate using the net present value (NPV) formula (Equation 5-3).

Equation 5-3. Net Present Value Formula

$$NPV = \frac{R_t}{(1 + i)^t}$$

Where:

$R$  = savings  
 $T$  = number of years in the future savings take place  
 $i$  = discount rate

We used different discount rates by state. Table 5-3 provides a summary of the discount rates that we used to discount the future savings.

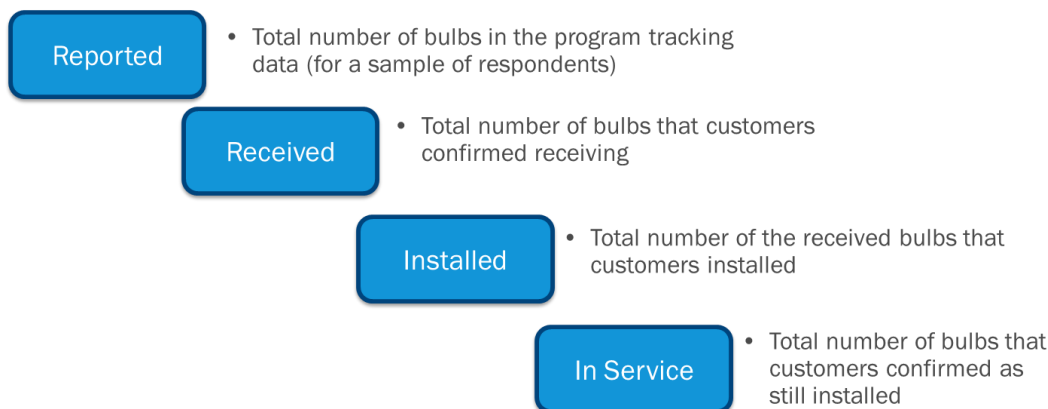
Table 5-3. Discount Rate Summary

State	Discount Rate
North Carolina	7.09%
South Carolina	7.25%

We made an additional adjustment to the installation trajectory to account for bulbs that participants never received. This adjustment was necessary because the installation rate trajectory assumes that light bulbs were acquired (purchased), and we found that not all program bulbs were received (and therefore could not be considered acquired). We further made an additional adjustment to account for the program LEDs installed outside of the DEC jurisdiction (leakage) as part of the in-service rate. We assessed leakage through the participant survey and determined it to be minimal at 1.7%.

The first-year ISR is calculated by dividing the total number of program LEDs reported in service by the total number of LEDs reported in the program-tracking database. We incorporated the receipt, installation, and persistence of program LEDs into the first-year ISR.

**Figure 5-1. Installation Rate Components**



The evaluation resulted in a first-year ISR of 59.9%. Relative precision around this point estimate is 7% at 90% confidence. Table 5-4 shows that the first-year ISR is lower for Phase 1 than Phase 0, likely due to the larger number of bulbs offered in Phase 1. The overall first-year ISR is weighted more towards the Phase 1 value due to a greater number of bulbs distributed in Phase 1 compared to Phase 0.

**Table 5-4. First-Year ISR**

Metric	Phase 0	Phase 1	Total
n	53	125	180
First-year ISR	72.4%	58.4%	59.9%
Relative precision (at 90% confidence)	9%	8%	7%

Note that due to the survey administration time frame, participants from Phase 2 were not part of the sample to calculate ISR.

Table 5-5 provides the installation rate trajectory that we used to allocate savings over time. After discounting the future installations by the DEC utility discount rate, the overall ISR decreased from 97.0% to 92.7% for NC and from 97.0% to 92.6% for SC.

**Table 5-5. DEC Cumulative Installation Rate Trajectory**

Program Year	Installation Trajectory before Discounting Future Installations by Utility Discount Rate		Installation Trajectory after Discounting Future Installations by Utility Discount Rate	
	NC	SC	NC	SC
Year 1	59.9%	59.9%	59.9%	59.9%
Year 2	76.3%	76.3%	75.3%	75.2%
Year 3	87.5%	87.5%	85.1%	85.0%
Year 4	97.0%	97.0%	92.7%	92.6%

After accounting for the leakage rate of 1.7%, the overall ISR is 91.1% for NC and 91.0% for SC.<sup>12</sup>

<sup>12</sup> Note that the leakage rate was applied first, followed by the cumulative net present value adjusted ISR.

## Baseline Wattage

The kits distributed through the program contained LEDs that are the equivalent of 60-watt incandescent products in terms of lumen output. The 2007 EISA required a gradual phase out of general service incandescent products, which impacts the baseline wattage that can be used to estimate energy savings. Manufacturers complied with EISA by creating a halogen bulb that met the efficiency requirements, effectively making halogens the new baseline. The EISA regulations affected 60-watt incandescent products in January 2014. However, manufacturers and retailers were allowed to sell their existing inventory of incandescent products so products did not immediately disappear from the market. Because some incandescent products may still have been available for purchase in 2016, assuming a halogen baseline may be too punitive.

To assess incandescent product availability and determine if any upward adjustments to the baseline wattage are warranted, Opinion Dynamics completed lighting shelf audits at a sample of 15 retail stores in DEC territory as part of the most recent DEC Retail LED program evaluation. The sample of 15 stores included 10 stores participating in the DEC Retail LED program and 5 non-participating stores. As part of the audits, we collected data on general service lighting products (including incandescent products), including the number of products by wattage category.

Of the 15 stores, none carried 60-watt incandescent products and most carried halogen products. Based on these findings, we will use the equivalent halogen wattage of 43 watts as the baseline wattage for LEDs distributed through the program.

## LED Wattage

LED wattage was based on the wattage of the actual bulbs distributed by the program during the evaluation period. Program kits exclusively featured 9-watt LEDs.

## Hours of Use and Coincidence Factors

The industry standard to estimate HOU is to conduct lighting logger studies. Opinion Dynamics recently completed an LED-specific HOU study as part of the evaluation of the DEC Retail LED and DEP EEL programs. As part of this study, we metered LED usage across a representative sample of 107 homes across DEP and DEC jurisdictions<sup>13</sup> with 61 homes located in the DEC jurisdiction specifically. The study yielded updated LED-specific and Carolinas-specific HOU and CF estimates. Table 5-6 provides LED HOU and CF estimates from the study.

Table 5-6. LED HOU and CF Assumptions

Statistic	LED Value
HOU	2.881
Summer CF	0.128
Winter CF	0.145

## Interactive Effects

The evaluation team chose to use HVAC system interaction factors for energy, summer, and winter demand estimated as part of two recent studies:

<sup>13</sup> Of 107 homes, 61 were in DEC jurisdiction.

- 2012 TecMarket Works Process and Impact Evaluation of the Residential Smart \$aver Energy Efficiency Products (CFLs) Program in the Carolina System
- 2012 DEP EEL program evaluation for winter peak demand interactive effects

Based on these studies, we used HVAC system interaction factors of  $-0.037$  for energy savings,  $0.168$  for summer peak demand savings, and  $-0.500$  for winter peak demand savings.

Due to differences in technologies, interactive effects caused by CFLs and LEDs are likely different. The difference in these effects is unclear, especially as it pertains to the DEC jurisdiction. We are unaware of any existing modeling or simulation efforts to estimate LED-specific interactive effects. In our professional judgment, the difference between CFL and LED interactive effects is likely to have only a marginal impact on energy and peak demand savings. Given the small anticipated change in energy and peak demand savings estimates due to LED-specific interactive effects, and the relatively high cost of conducting the modeling and simulation needed to estimate those interactive effects, the evaluation team believes that the interactive effect estimates for CFLs in the studies listed above are appropriate to use.

## 5.2 Gross Impact Results

The evaluation team received program-tracking data in two extracts. One extract contained product and shipment information and the other contained customer contact information. The shipment data extract did not contain participant contact information (phone numbers and email addresses) that is critical for conducting a participant survey. As such, we merged shipment information with customer information using customer account number as the linking unique identifier.

Upon merging the program-tracking data files, the evaluation team analyzed the data for any gaps and inconsistencies. As part of the analysis, we performed the following steps:

- Checked the core data fields for missing values<sup>14</sup>
- Checked the data for temporal gaps (due to missing invoices, transactions, or other data gaps) by exploring reasonable variation in monthly invoiced sales

We found that necessary data fields were clean, fully populated, and contained all necessary information to proceed with the impact analysis.

Using the equations and inputs discussed in Section 5.1, we calculated gross energy and peak demand savings achieved by the program during the evaluation period. Table 5-7 presents the results of the analysis. The Free LED program realized 112% of the reported gross energy savings, 127% of the reported summer peak demand savings, and 171% of the reported winter peak demand savings.

<sup>14</sup> This excludes the email address data field as we expect that not every participant would have provided his or her email address.



Table 5-7. Gross Impact Results

Phase	Total Savings	Ex Ante Savings	Ex Post Gross Savings	Gross Realization Rate
0	Bulbs	343,848	343,848	
	Energy savings (MWh)	10,836	10,782	100%
	Summer peak demand savings (MW)	1.4	1.6	113%
	Winter peak demand savings (MW)	0.5	0.8	152%
1	Bulbs	2,265,652	2,265,652	
	Energy savings (MWh)	71,398	71,046	100%
	Summer peak demand savings (MW)	9.2	10.5	113%
	Winter peak demand savings (MW)	3.3	5.1	152%
2	Bulbs	464,586	464,586	
	Energy savings (MWh)	4,115	14,568	354%
	Summer peak demand savings (MW)	0.5	2.2	404%
	Winter peak demand savings (MW)	0.2	1.0	542%
Total	Bulbs	3,074,086	3,074,086	
	Energy savings (MWh)	86,349	96,396	112%
	Summer peak demand savings (MW)	11.2	14.2	127%
	Winter peak demand savings (MW)	4.0	6.9	171%

The key driver of the higher-than-program-reported energy savings is the use of a higher ex post baseline wattage for Phase 2 bulbs in our evaluation. The ex ante savings assumed a baseline wattage of 18.6 for LEDs distributed during Phase 2 of evaluation. The program team used lower baseline wattage assumptions for Phase 2 participants to account for likely replacement of LEDs with CFLs. However, the evaluation team recommends using a halogen-equivalent baseline wattage of 43. Higher ex post savings were also driven by our use of a slightly higher ISR. The reduction in HOU drove energy savings downward, but did not outweigh the effect of the higher baseline wattage for Phase 2 LEDs and ISR. Higher summer and winter peak demand savings are a result of higher ex post CFs.

Using total ex post gross energy and demand savings, the evaluation team calculated per-bulb savings (Table 5-8). We recommend that the program applies these per-unit savings values to calculate program impacts moving forward.

Table 5-8. Ex Post Total and Per-Bulb Gross Impacts

Savings Type	Number of Bulbs	Ex Post Gross Savings	Ex Post Gross Per-Bulb Savings
Energy savings (kWh)	3,074,086	96,396,086	31.4
Summer peak demand savings (kW)		14,236	0.0046
Winter peak demand savings (kW)		6,904	0.0022



## 5.3 References

Navigant Consulting, Inc. and Apex Analytics, LLC. *EM&V Report for the 2013 Energy Efficient Lighting Program*. Prepared for Duke Energy Progress. August 13, 2014.

Navigant Consulting, Inc. and Apex Analytics, LLC. *EM&V Report for the 2012 Energy Efficient Lighting Program*. Prepared for Duke Energy Progress. July 12, 2013.

TecMarket Works. *Process and Impact Evaluation of the Residential Smart \$aver Energy Efficiency Products (CFLs) Program in the Carolina System*. Prepared for Duke Energy Carolinas. September 2012.

Opinion Dynamics Corporation. *Duke Energy Progress & Duke Energy Carolinas Energy Efficient Lighting & Retail LED Programs*. Prepared for Duke Energy Progress and Duke Energy Carolinas. (Currently in Draft Phase).

## 6. Net-to-Gross Analysis

This section describes our approach for estimating the NTGR for the Free LED program and presents the resulting NTGR and the program net impacts.

### 6.1 Methodology

The NTGR represents the portion of the gross energy savings associated with a program-supported measure or behavior change that would not have been realized in the absence of the program. In other words, the NTGR represents the share of program-induced savings. The NTGR consists of FR and SO and is calculated as  $(1 - FR + SO)$ . FR is the proportion of the program-achieved verified gross savings that would have been realized absent the program. There are two types of SO: participant and non-participant. Participant SO occurs when participants take additional energy-saving actions that are influenced by program interventions but did not receive program support. Non-participant SO is the reduction in energy consumption and/or demand by non-participants because of the influence of the program.

As part of this evaluation, the evaluation team estimated FR and participant SO. Quantifying savings from non-participant SO activities is a challenging task that warrants a separate study and was outside of the scope of this evaluation effort. In addition, the Free LED program design is less likely to result in significant amounts of non-participant SO than upstream lighting programs that exist in the larger market. Both FR and SO components of the NTGR were derived from self-reported information from telephone interviews with program participants.

The final NTGR is the percentage of gross program savings that can reliably be attributed to the program. We estimate a separate NTGR for each participant, which we weighted to reflect the relative contribution of each participant's ex post gross savings to the overall program estimate.

Below is a general overview of the method for developing FR and SO estimates. **Error! Reference source not found.** of this report contains the participant survey instrument. **Error! Reference source not found.** provides a detailed overview of the FR and SO algorithms.

#### 6.1.1 Free-Ridership

Free-riders are program participants who would have installed high efficiency light bulbs on their own without the program. FR represents the percent of savings that would have been achieved in the absence of the program. Through participant surveys, we asked program participants a series of structured and open-ended questions about the influence of the program on their decision to order and install program LEDs. The survey questions measured the following areas of program influence:

- **Influence efficiency:** We asked participants what type of light bulbs they would have purchased the next time they needed light bulbs if they had not received free LEDs through the program.
- **Influence on timing:** We asked participants who replaced working incandescent bulbs if they would have replaced working light bulbs on their own if they had not received free LEDs, or if they would have waited for the bulbs to burn out.
- **Influence on quantity:** We asked participants whether they would have purchased fewer LEDs if they had purchased the bulbs on their own instead of receiving them for free through the program.

As part of the FR survey module, we referenced retail bulb pricing to ground participant responses.<sup>15</sup> To reduce measurement error, we included follow-up questions to check participant responses for consistency. We also compared participant FR scores to the other survey responses and made the necessary adjustments.

## 6.1.2 Spillover

SO represents energy savings from additional actions (expressed as a percent of total program savings) that were due to the program but that did not receive program financial support. While SO can result from a variety of measures, it is not possible to ask about a large number of potential SO measures on a survey due to the need to limit the length of the survey. The evaluation team chose to focus on the measures that participants would reasonably take following their program participation and would do so without additional program support. As such, we focused SO questions on CFLs and LEDs. We asked participants if they purchased any CFLs or LEDs after receiving program LEDs.<sup>16</sup> We asked those who purchased additional bulbs about the degree to which the program influenced their decision to purchase high-efficiency bulbs as opposed to less-efficient alternatives. We asked participants to rate the degree to which the program influenced their purchase decision, as well as to provide a rationale for their rating. We carefully reviewed participant responses to establish eligibility for SO participants and purchases.

To estimate the SO rate, we estimated savings for each SO measure using the standard savings equation and a set of engineering assumptions. We determined the program-level SO rate by dividing the sum of SO savings by the ex post gross savings achieved by the sample of participants who received SO questions.

### Equation 6-1. SO Rate Formula

$$\text{Spillover Rate} = \frac{\text{Spillover Savings}}{\text{Evaluated Gross Savings in the Respondent Sample}}$$

## 6.2 NTG Results

We estimate the overall FR to be 51% and SO to be 1%. The resulting program NTGR for the evaluation period is 50%. Relative precision around this point estimate is 8% at 90% confidence. Table 6-1 provides FR results by phase, as well as overall across all three phases, along with SO and final program-level NTGR. As can be seen in the table, FR for Phase 2 is considerably higher than FR for Phase 1 (64% vs. 50%). Phase 2 participants include customers who reached or exceeded their free CFL bulb limit through the various free lighting programs with orders over 5 years or more since order date, which may suggest that these individuals are at the forefront of energy-efficient product adoption and had a considerable amount of time to learn and experience the benefits from energy-efficient lighting products, such as CFLs and LEDs. It should be noted that, while we were able to achieve better than 10% precision at 90% confidence for the overall program-level FR estimate, as well as for Phase 1, relative precision is quite high (19%) for Phase 2. We applied the overall program level NTG of 50% to ex post gross impacts to arrive at the ex post net impacts.

<sup>15</sup> We used a per-bulb price of \$2 for CFLs and \$4 for LEDs. CFL pricing is based on the current market data, while retail LED pricing was supplied by the program team.

<sup>16</sup> Note that the assessment of program SO is based on Phase 0 and Phase 1 participants.

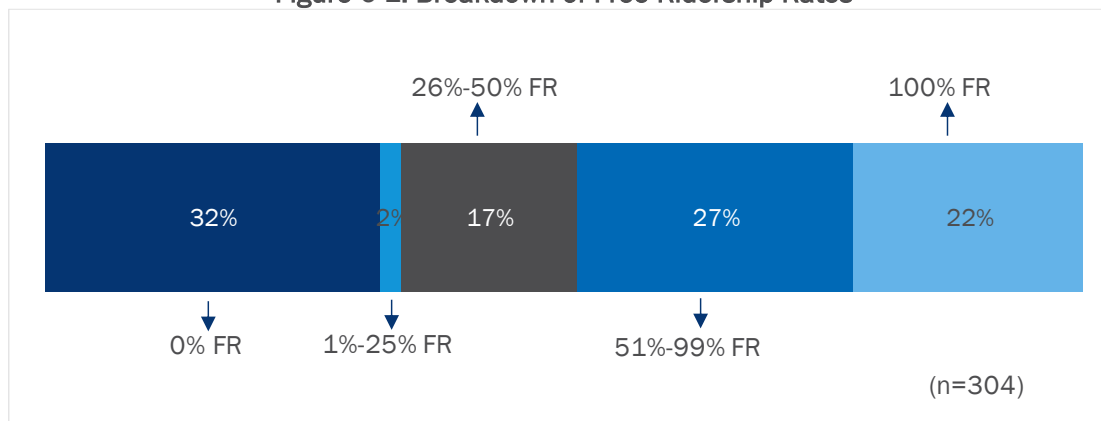
Table 6-1. NTG Results

NTG Component	n	Value	Relative Precision
FR – Phase 0	1	44%	N/A
FR – Phase 1	272	50%	8%
FR – Phase 2	31	64%	19%
<b>FR – Total</b>	<b>304</b>	<b>51%</b>	<b>7%</b>
SO	178	1%	9%
NTGR	482	50%	8%

## 6.2.1 Free-Ridership

Our results show that free-ridership rates varied across participants (see Figure 6-1). Three in 10 participants (32%) are complete non-free-riders. That is, in the absence of the program's free LEDs, they would have purchased less-efficient alternatives, namely, halogens. At the opposite end of the FR spectrum, 22% are complete free-riders who reported that they would have purchased all of the LEDs that they received through the program on their own.<sup>17</sup> A combined 46% of respondents are partial free-riders (FR between 1% and 99%). Participants could be partial free-riders for several reasons. Some of the partial free-riders are participants who reported that in the absence of receiving the program's free LEDs, they would have purchased a mix of LEDs or CFLs and halogens the next time they needed to purchase light bulbs. Other partial free-riders are customers who reported that they would have purchased efficient bulbs (CFLs or LEDs) on their own but reported that the program motivated them to replace their working incandescent or halogen light bulbs with efficient bulbs, which they would not have done on their own. In essence, the program sped up their installation of energy efficient bulbs.

Figure 6-1. Breakdown of Free-Ridership Rates



The program NTGR of 50% was low compared to the previous evaluation of this program, where CFLs were the program measure (84%), and is a likely result of increased customer knowledge of energy-efficient lighting products and their benefits and positive results of the previous Free CFL program interventions. As compared to the general population of DEC customers, program participants had higher-incomes and higher levels of educational attainment, and both of these cohorts had higher FR and consequently lower NTGRs. We discuss the differences in participant composition and their effect on FR in greater detail in Section 7.2 of this report.

<sup>17</sup> This cohort also includes rare cases of respondents reporting that in the absence of the program they would have purchased CFLs.

## 6.2.2 Spillover

A quarter of the Free LED program participants (25%) purchased additional light bulbs since participating in the program. Of those, 7 in 10 (71%) purchased CFLs or LEDs, either exclusively or along with incandescents or halogens. Of those, 81% reported that their purchases were influenced by the program so that overall, 10% of all participants qualified for SO. The average SO participant purchased 5.1 bulbs that qualified for SO, most of those being LEDs.

## 6.3 Net Impact Results

Table 6-2 presents ex post gross and net savings along with the net realization rates for the program period under evaluation. We developed net realization rates by dividing ex post net savings by program-reported net savings. We present net impact results by program phase as well as overall. Overall, the program achieved 48,476 MWh in ex post net energy savings, 7.2 MW in ex post net summer peak demand savings, and 3.5 MW in ex post net winter peak demand savings, achieving 67%, 77%, and 103% net realization rates, respectively.

Table 6-2. Net Impact Results for 2012–2015 Evaluation Period

Phase	Total Savings <sup>a</sup>	Ex Post Gross Savings	Ex Post Net Savings	Net Realization Rate <sup>b</sup>
0	Energy savings (MWh)	10,782	5,422	60%
	Summer peak demand savings (MW)	1.6	0.8	68%
	Winter peak demand savings (MW)	0.8	0.4	92%
1	Energy savings (MWh)	71,046	35,728	60%
	Summer peak demand savings (MW)	10.5	5.3	68%
	Winter peak demand savings (MW)	5.1	2.6	92%
2	Energy savings (MWh)	14,568	7,326	213%
	Summer peak demand savings (MW)	2.2	1.1	243%
	Winter peak demand savings (MW)	1.0	0.5	327%
Total	Energy savings (MWh)	96,396	48,476	67%
	Summer peak demand savings (MW)	14.2	7.2	77%
	Winter peak demand savings (MW)	6.9	3.5	103%

<sup>a</sup> Savings were calculated using unrounded assumptions, including NTGR.

<sup>b</sup> Denominator is ex ante net savings.

## 7. Process Evaluation

### 7.1 Methodology

Process assessment leveraged the following data collection methods and research activities:

- Program staff interviews (n=1)
- Materials review
- Program-tracking data analysis
- Participant survey (n=482)

We provide a detailed overview of each data collection method, as well as achieved confidence and precision in Section 4 of this report.

### 7.2 Key Findings

#### 7.2.1 Program Performance

Between February 29, 2016 and April 28, 2017, 3,074,086 LED were distributed through the Free LED program in the DEC jurisdiction. During this period, the program touched 251,168 residential customers<sup>18</sup> and distributed an average of 12 bulbs per participant.

Table 7-1 shows participation by program phase. As can be seen in the table, the Free LED program reached 23% of participants during Phase 0. However, because the maximum number of LEDs during that phase was capped at six and was increased to 15 and 12 bulbs (for Phase 1 and 2, respectively), the number of LEDs distributed as part of Phase 0 accounts for just 11% of all LED distributed during the program period under evaluation. Phase 1 was the most prominent for the period, accounting for 63% of participants and 74% of all LEDs.

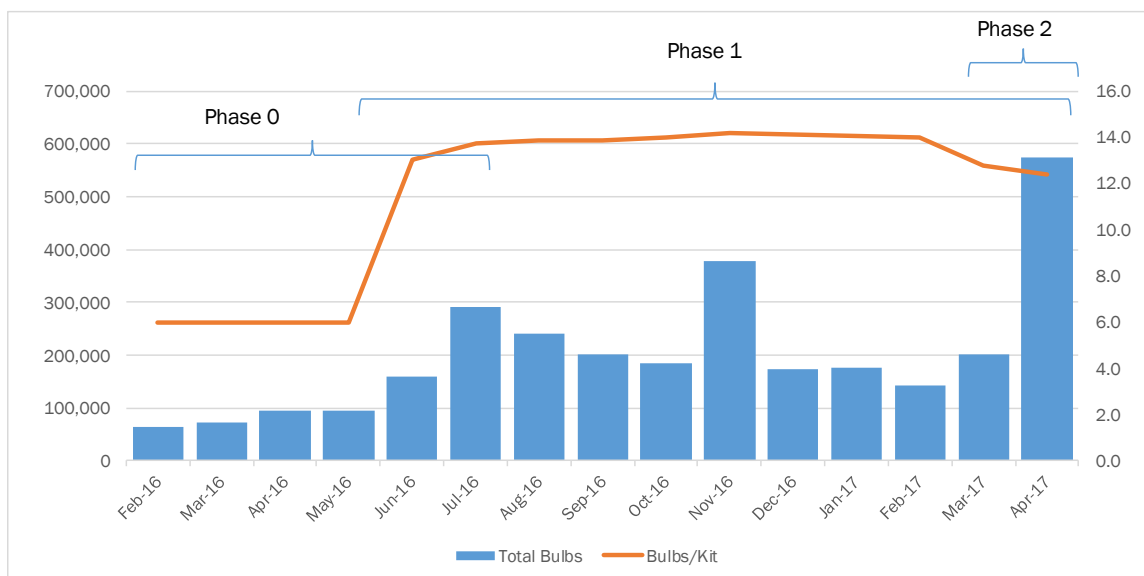
Table 7-1. Participation by Program Phase

Phase	% of Participants (n=251,168)	% of Bulbs (n=3,074,086)
0	23%	11%
1	63%	74%
2	16%	15%
Total	100%	100%

Program participation over time was well distributed, with participation spikes occurring at the starts of Phases 1 and 2, likely in response to the marketing efforts promoting each phase. Figure 7-1 shows participation trends over the course of the program period under evaluation and marks the start and duration of each phase.

<sup>18</sup> For the purposes of this analysis, we defined residential customers as unique accounts.

Figure 7-1. Participation Trends over Time



Program participants tend to participate in the program just once and order the maximum number of LEDs allowable. Only 3% of participants requested program LEDs more than once. Table 7-2 provides a percent distribution of program-distributed kits and bulbs by phase and kit size. Phase 0 participants could receive up to six LEDs, and all of the kits distributed during this phase were 6-bulb kits. Phase 1 participants were offered a range of kit configurations, including 3-bulb, 6-bulb, 8-bulb, 12-bulb, and 15-bulb kits, with a maximum of 15 LEDs per account. Close to 9 in 10 kits (87%) distributed during this phase were 15-bulb kits. Phase 2 participants were offered 6-bulb and 12-bulb kits, with 93% of all kits distributed during that phase being 12-bulb kits.

Table 7-2. Kit Size Distribution by Phase

Kit Size	Phase 0		Phase 1		Phase 2	
	% of Kits (n=57,308)	% of Bulbs (n=343,848)	% of Kits (n=161,300)	% of Bulbs (n=2,265,652)	% of Kits (n=40,112)	% of Bulbs (n=464,586)
3-bulb kit	0%	0%	2%	<1%	N/A	N/A
6-bulb kit	100%	100%	6%	2%	7%	4%
8-bulb kit	N/A	N/A	<1%	<1%	N/A	N/A
12-bulb kit	N/A	N/A	4%	4%	93%	96%
15-bulb kit	N/A	N/A	87%	93%	N/A	N/A
Total	100%	100%	100%	100%	100%	100%
Average number of kits/bulbs	1.0	6.0	1.0	14.2	1.0	11.6

To be eligible for the program, customers must have an active DEC account. Program participation is controlled, wherein customers must provide their account number or the phone number associated with their account, as well as the last four digits of their social security number. Once requested, program bulbs are shipped to the billing address associated with the customer's account. Such controlled program design resulted in minimal leakage of program bulbs outside of the DEC jurisdiction. Fewer than 1% of bulbs (0.7%) were shipped outside of North and South Carolina and fewer than 1% of participants (0.6%) reported installing program bulbs in homes not serviced by DEC.



## 7.2.2 Participant Composition

Participant composition analysis included comparing participant sociodemographic and household characteristics gathered as part of the participant survey effort and comparing them to the DEC population. We obtained population characteristics from the U.S. Census's 2013–2015 American Community Survey (ACS). As part of the analysis, we examined FR rates by each of the sociodemographic subgroups. The analysis allowed us to identify the customer types that the program is reaching and future targeting opportunities to improve the efficacy of the program in advancing energy efficiency in the jurisdiction. Table 7-3 provides the results of the analysis. As can be seen in the table, during the program period under evaluation, program participant composition skews disproportionately toward younger customers (29% of participants are 18–34 vs. 18% of the DEC customer base), renters (39% of program participants vs. 29% of the DEC customer base), customers with higher levels of education (50% of participants have a college degree+ vs. 27% of the DEC customer base), and customers with higher income levels (56% of participants have an annual income of \$50,000+ vs. 48% of the DEC customer base).

Disproportionate participation of higher-income customers and customers with higher education levels had a negative impact on program's net impacts, because FR among those two customer cohorts is much higher than their respective counterparts. As can be seen in Table 7-3, FR among customers without higher education is 32%, compared to the FR of 57% among those with some college, and 58% among college graduates+. Similarly, FR among those with annual household incomes of less than \$50,000 is 44%, while FR among those with incomes of \$50,000 to less than \$100,000 and \$100,000+ is 60% and 59%, respectively. As described further in this section of the report, OLS portal is the primary mechanism through which participants ordered program LEDs. As a channeling mechanism, the OLS portal does offer the ability to target certain customer segments but rather allows everyone who is eligible for the program to order program LEDs.

Conversely, the disproportionate presence of renters helped drive program FR down. FR for renters is 43%, much lower than for those who own their homes (61%). These findings suggest that focusing program efforts on targeting customers in rental properties, lower-income customers, and customers with lower levels of educational attainment will help reduce the program FR rate, thus ensuring a more efficacious program. To avoid possible overlap with Duke Energy's Multi-Family program, which targets multi-family apartment complexes, the program should consider prioritizing rental single-family properties and rental units in smaller multi-family properties (less than 10 units, for example). One way to achieve that is through geographic targeting of the census block groups with high concentrations of rental units and high concentration of 1-10 unit properties.

Table 7-3. Participant Composition Analysis

Characteristics	Free-Ridership Rate	Participant Characteristics	DEC Population Estimates
<b>Age</b>		<b>n=462</b>	<b>Census Data</b>
18–34	50%	29%	18%
35–54	55%	35%	40%
55+	52%	36%	41%
<b>Homeownership</b>		<b>n=479</b>	<b>Census Data</b>
Own	61%	61%	71%
Rent	43%	39%	29%
<b>Education</b>		<b>n=475</b>	<b>Census Data</b>
High school or less	32%	16%	64%
Some college	57%	34%	9%
College graduate+	58%	50%	27%



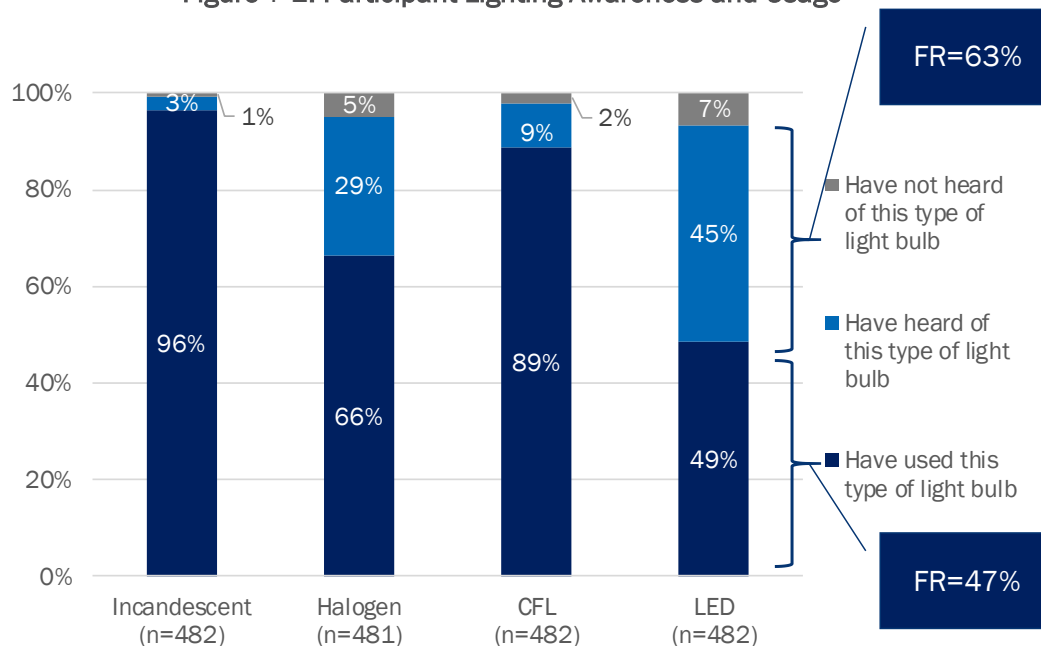
Characteristics	Free-Ridership Rate	Participant Characteristics	DEC Population Estimates
<b>Income</b>		<b>n=452</b>	<b>Census Data</b>
Less than \$50,000	44%	44%	52%
\$50,000 to less than \$100,000	60%	36%	30%
\$100,000+	59%	20%	18%
<b>Housing type</b>		<b>n=481</b>	<b>Census Data</b>
Single-family	55%	66%	69%
Non-single-family (townhouse, mobile home, multifamily)	51%	34%	31%

### 7.2.3 Participant Lighting Knowledge and Experience

The participant survey explored participants' existing knowledge and experience with a variety of lighting products, along with their use of the various technologies. As can be seen in Figure 7-2, participants are knowledgeable and experienced with energy-efficient technologies. More specifically, nearly all participants had heard of CFLs (98%) and 89% had used CFLs prior to participating in the program. Such high levels of previous CFL use are not surprising given the past efforts, both programmatic and non-programmatic, to advance CFL adoption in the jurisdiction. Based on the Opinion Dynamics estimates presented in the most recent 2015 evaluation of the Free CFL program, since 2010 and through the March 2015 implementation of the Free CFL program, the program had reached more than three-quarters (76%) of DEC's residential customers.

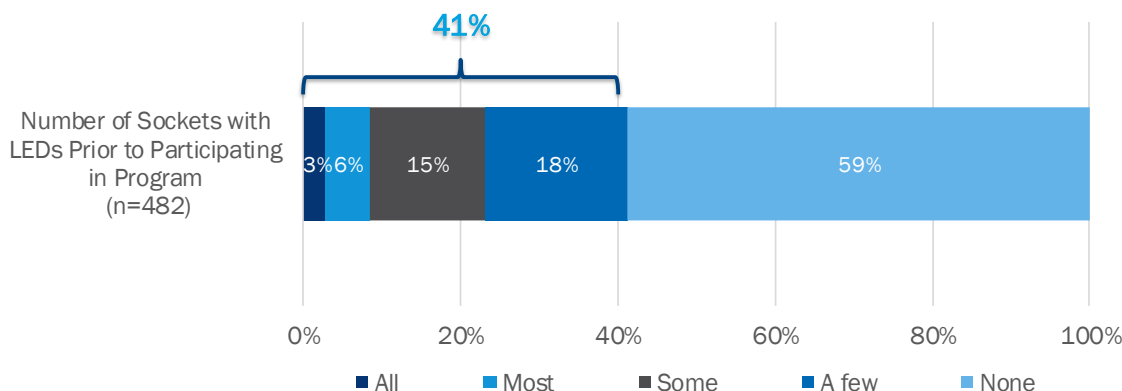
Nearly all participants had heard of LEDs prior to participating in the program (93%) and almost half (49%) had used LEDs. Not surprisingly, previous experience with LEDs drives FR rates; participants with LED experience have much higher FR rates than those who are aware of the technology, but have not used it (65% FR vs. 50% FR, respectively). Prior LED usage is disproportionately lower among customers residing in multifamily homes, customers who rent their homes, younger customers, and customers with lower levels of education and lower income levels. Targeting these customers will help ensure program reach into the underserved segment and drive FR down.

Figure 7-2. Participant Lighting Awareness and Usage



As part of the survey, we asked participants to estimate the number of light sockets in their homes that had LEDs prior to participating in the program. As shown in Figure 7-3, 41% had LEDs in at least a few of their sockets prior to participating in the program, and 9% had LEDs in most or all of their sockets.<sup>19</sup>

Figure 7-3. Pre-Program LED Saturation



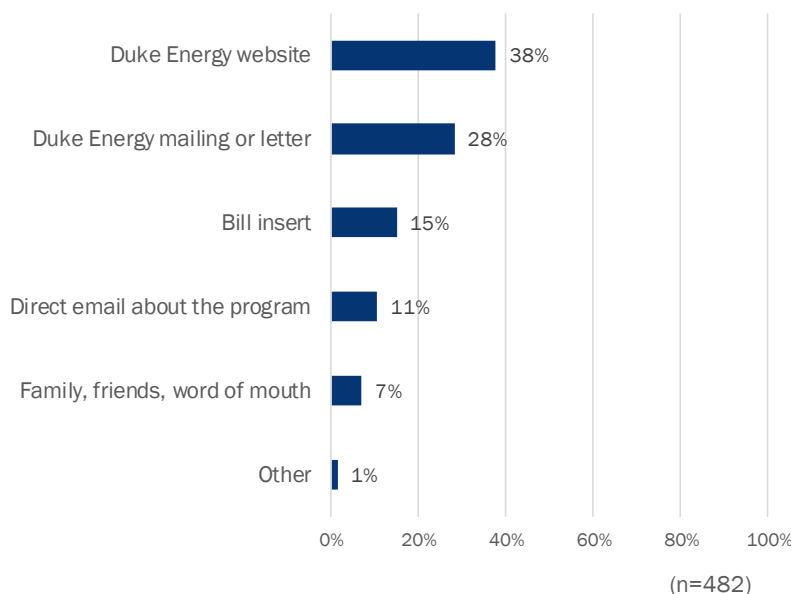
With participants having used CFLs, many are replacing CFLs with program LEDs. More specifically, more than half of participants (57%) replaced CFLs or LEDs with program LEDs, and more than a fifth of participants (22%) installed all program LEDs in place of CFLs or LEDs.

<sup>19</sup> The 41% reporting having LEDs in at least some of the sockets is seemingly inconsistent with 49% reporting having used LEDs in the past in Figure 7-1. However, it is feasible that some participants had used LEDs at some point but has since removed them.

## 7.2.4 Program Marketing and Outreach

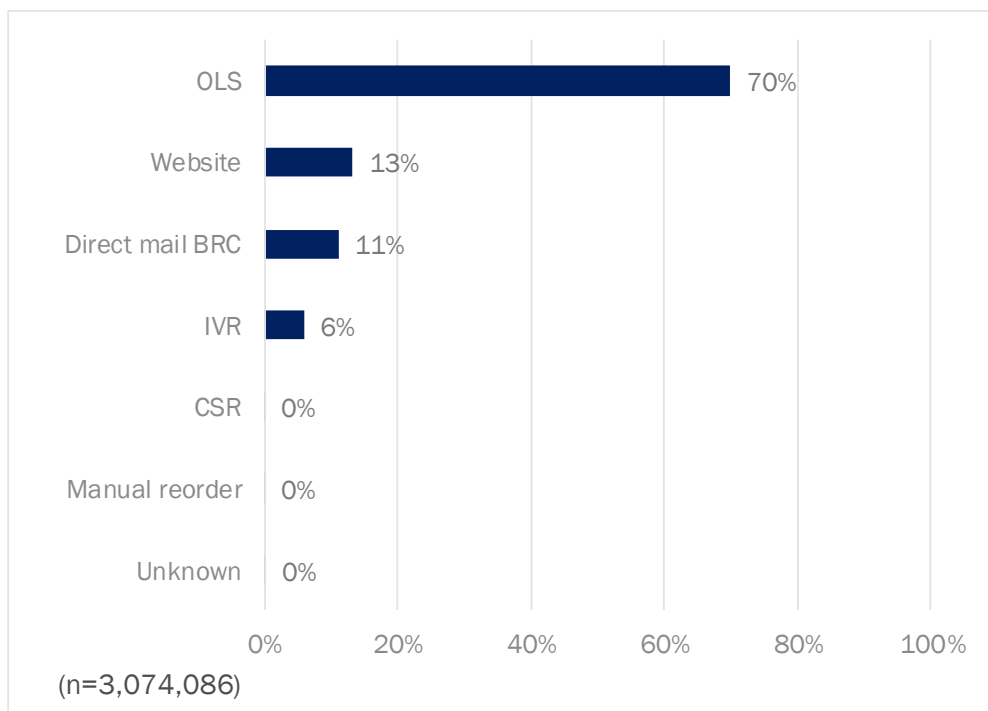
Program marketing efforts during the program period under evaluation were focused and targeted. Program marketing varied depending on the program phase. Phase 0 marketing relied almost exclusively on a BRC mailing, while Phase 1 and Phase 2 marketing efforts made use of a dedicated program website, an OLS portal with a pop-up intercept, and mailers. As part of the participant survey, we asked participants how they first learned about the Free LED program. Consistent with program marketing, the Duke Energy website and mailings were the primary sources of program awareness (Figure 7-4).

Figure 7-4. Sources of Program Awareness



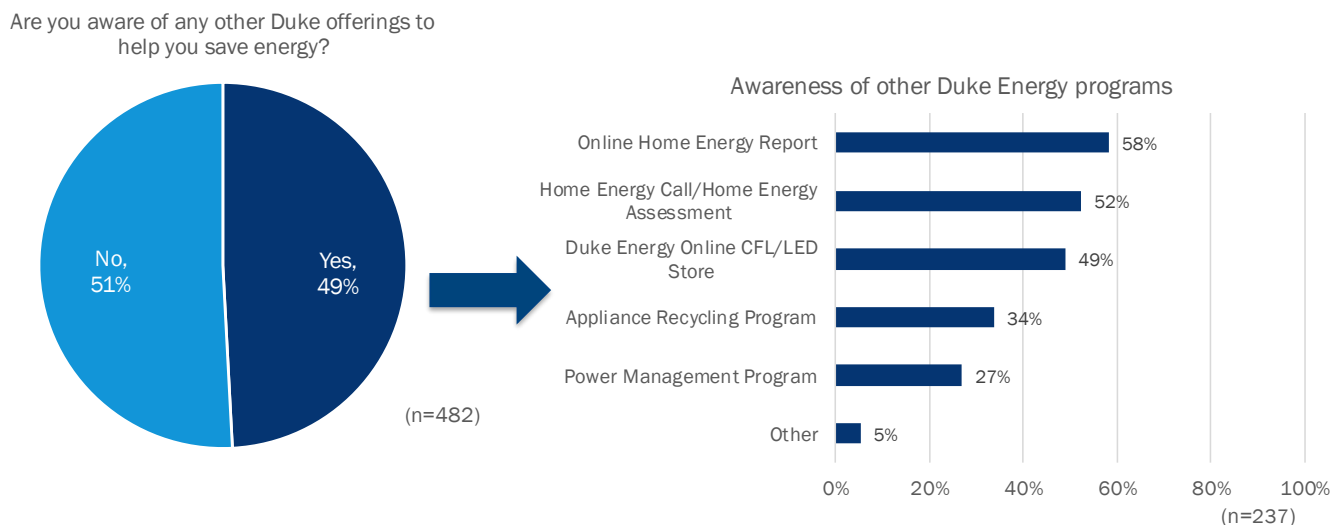
DEC customers could participate in the program through several modes, including mailing back their BRC, making an order through the OLS portal or on Duke Energy's website, the IVR phone system, or ordering bulbs through a customer service representative (CSR), along with a manual reorder. Figure 7-5 summarizes program LED shipments (in terms of bulbs) by order mode. As can be seen in the figure, 70% of the program LEDs were ordered through the OLS portal.

Figure 7-5. Program Participation Mode



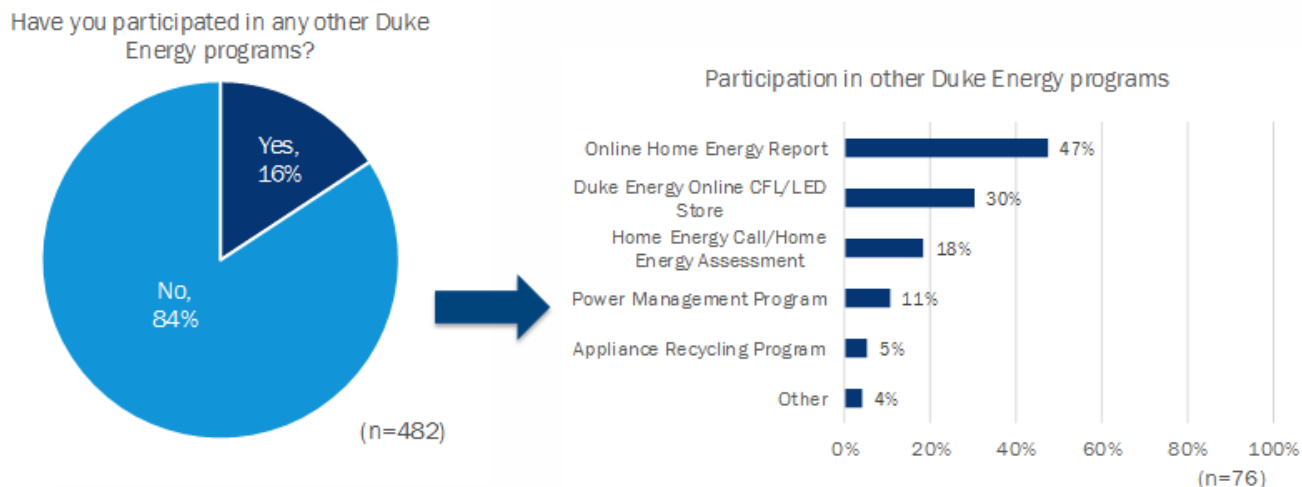
In addition to sources of the Free LED program awareness and modes of participant intake, our process evaluation explored participant knowledge of the other energy efficiency programs that Duke Energy offered. As part of the participant survey, we asked respondents about their awareness of and previous participation in DEC's other energy efficiency programs. Almost half of program participants (49%) were aware of other Duke Energy programs, including the Online Home Energy Report, the Home Energy Assessment, and the Online Store programs (Figure 7-6).

Figure 7-6. Cross-Program Awareness



A relatively small percentage of Free LED program participants also participated in the other Duke Energy programs. As can be seen in Figure 7-7, 16% of Free LED program participants also participated in other programs offered by DEC. Of those, close to half (47%) received an online home energy report, 30% purchased energy-efficient lighting products from DEC's Online Store, 18% received home energy assessments, 11% participated in the Power Management program, and 5% in the Appliance Recycling program.

Figure 7-7. Cross-Program Participation

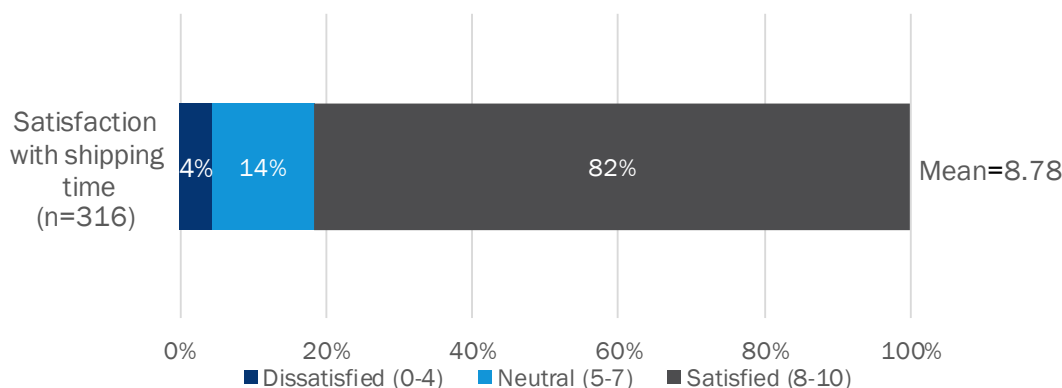


## 7.2.5 Program Delivery and Participant Satisfaction

Program delivery processes were smooth and well managed. Program-tracking data were clean and well maintained. The program implementer worked hard to control maximum LED ordering caps. Our analysis of the program tracking found a very small percent of cases where participants received more than phase-specific bulb limits. The rare cases where that occurred were justified by the previously ordered LED counts and available kit configurations.

The program implementer also worked hard to ensure prompt delivery of the ordered LED kits. Based on the participant survey results, 9 in 10 participants (90%) reported receiving their LEDs in the mail within 3 weeks and more than a quarter (29%) reported receiving their LEDs within 1 week. More than 8 in 10 (82%) reported being satisfied<sup>20</sup> with the time it took to receive their order; 59% of respondents reported being extremely satisfied<sup>21</sup> (Figure 7-8).

Figure 7-8. Satisfaction with Shipping Timelines



Program-related inquiries from program participants were rare. Only 4% of participants reported contacting Duke Energy or program staff after receiving their bulbs. Most of those inquiries were focused on non-program-related questions or questions about other programs. Nearly three-quarters of those who contacted Duke Energy (74%) reported that they were satisfied<sup>22</sup> with their communication with the Duke Energy staff.

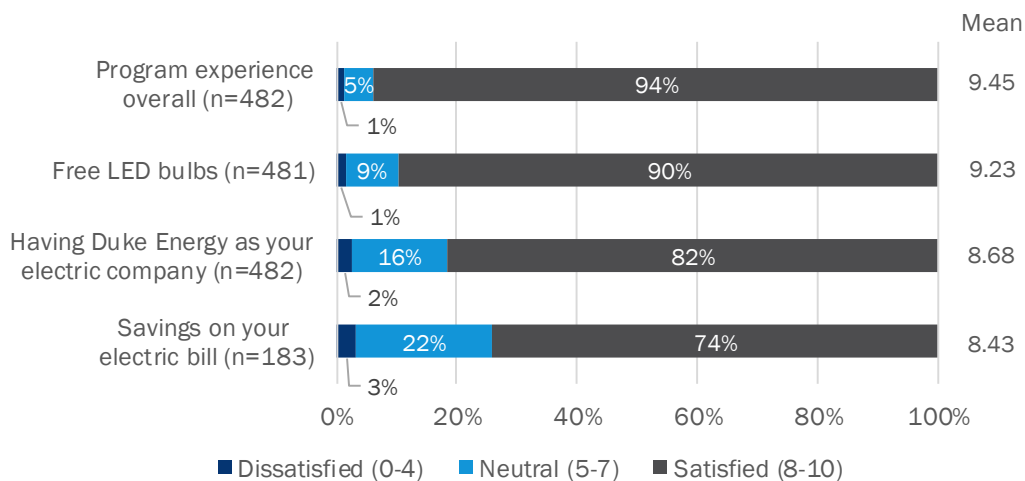
Participants expressed high levels of satisfaction with the program, which is another indication that program processes are effective and well run. As can be seen in **Error! Reference source not found.**, 94% of participants are satisfied with their program experiences overall and 90% are satisfied with the program LEDs.

<sup>20</sup> A rating of 8, 9, and 10 on a scale from 0 to 10, where 0 is very dissatisfied and 10 is very satisfied.

<sup>21</sup> A rating of 10 on a scale from 0 to 10, where 0 is very dissatisfied and 10 is very satisfied.

<sup>22</sup> A rating of 8, 9, and 10 on a scale from 0 to 10, where 0 is very dissatisfied and 10 is very satisfied.

Figure 7-9. Satisfaction Ratings



## 8. Conclusions and Recommendations

This section presents conclusions and recommendations resulting from the process and impact evaluations of the Free LED program.

### 8.1 Conclusions

Between February 29, 2016 and April 28, 2017, the Free LED program distributed 3,074,086 LEDs across 258,720 kits to 251,168 DEC customers. The program relied on a phased approach to program delivery with a total of three phases, each featuring distinct design and delivery elements. The program achieved 96,396 MWh in ex post gross energy savings, 14.2 MW in ex post summer peak demand savings, and 6.9 MW in winter peak demand savings across the three phases. The program realized 112% of energy savings, 127% of summer peak demand savings, and 171% of winter peak demand savings. High realization rates are primarily a result of the program using lower baseline wattage assumptions<sup>23</sup>, first-year ISR, and coincidence factors when estimating savings for LEDs distributed during Phase 2 of the program.

While the overall ISR was high (91.1% for North Carolina and 91.0% for South Carolina), first-year ISR was low, at 59.9%. The low first-year ISR is driven primarily by the fact that customers were able to receive up to 15 LEDs at once, depending on the phase, and most took advantage of the offering and ordered the maximum number of bulbs allowable.

The program NTGR of 50% was low compared to the previous evaluation of this program, where CFLs were the program measure (84%), and is a likely result of increased customer knowledge of energy-efficient lighting products and their benefits and positive results of the previous Free CFL program interventions. Program participant composition was disproportionately skewed toward higher-income customers and customers with higher levels of educational attainment, and both of these cohorts had higher FR and consequently lower NTGRs.

After applying program NTGR to the ex post savings, the program achieved 48,476 MWh in energy savings, 7.2 MW in summer peak demand savings, and 3.5 MW in winter peak demand savings. Table 8-1 provides a summary of the program's gross and net impacts overall and by phase.

---

<sup>23</sup> The program team used lower baseline wattage assumptions for Phase 2 participants to account for likely replacement of LEDs with CFLs.



Table 8-1. Overview of Program Impacts

Phase	Total Savings	Ex Ante Results	Ex Post Gross Results	Gross Realization Rate	Ex Post Net Results	Net Realization Rate
0	Bulbs	343,848	343,848			
	Energy savings (MWh)	10,836	10,782	100%	5,422	60%
	Summer peak demand savings (MW)	1.4	1.6	113%	0.8	68%
	Winter peak demand savings (MW)	0.5	0.8	152%	0.4	92%
1	Bulbs	2,265,652	2,265,652			
	Energy savings (MWh)	71,398	71,046	100%	35,728	60%
	Summer peak demand savings (MW)	9.2	10.5	113%	5.3	68%
	Winter peak demand savings (MW)	3.3	5.1	152%	2.6	92%
2	Bulbs	464,586	464,586			
	Energy savings (MWh)	4,115	14,568	354%	7,326	213%
	Summer peak demand savings (MW)	0.5	2.2	404%	1.1	243%
	Winter peak demand savings (MW)	0.2	1.0	542%	0.5	327%
Total	Bulbs	3,074,086	3,074,086			
	Energy savings (MWh)	86,349	96,396	112%	48,476	67%
	Summer peak demand savings (MW)	11.2	14.2	127%	7.2	77%
	Winter peak demand savings (MW)	4.0	6.9	171%	3.5	103%

Table 8-2 provides per-unit ex post gross and net savings.

Table 8-2. Per-Unit Ex Post Gross Savings

Per-Bulb Savings	Ex Post Gross Savings	Ex Post Net Savings
Energy savings (kWh)	31.4	15.8
Summer peak demand savings (kW)	0.0046	0.0023
Winter peak demand savings (kW)	0.0022	0.0011

The program implementation processes ran smoothly and effectively, resulting in high levels of customer satisfaction with the program. Program-tracking data were complete and accurate. Instances of products mailed and installed outside of the DEC jurisdiction were minimal. Instances of participants receiving more than the phase-based maximum number of bulbs through the program were also minimal.

## 8.2 Recommendations

We recommend that program administrators calculate future savings from the Free LED program using the recommended per-bulb energy and summer peak savings presented in Table 8-2 above.

To increase program efficacy, we recommend that the program deploys targeted marketing and outreach strategies aimed at increasing participation among lower-income customers and customer with lower levels of educational attainment, while also continuing to reach out to renters and younger customers. Those customer cohorts are less likely to be free-riders and the program therefore will be able to effect change in their lighting preferences and behaviors. Such targeting can be achieved by overlaying census data over the

*Conclusions and Recommendations*

customer data and targeting customers in geographic units (such as census block groups) with higher shares of the desired segment.

To improve its first-year ISR and subsequently the overall ISR, we recommend that the program includes collateral urging customers to install as many program LEDs as possible by replacing working, less-efficient bulbs in their homes.

## 9. Summary Form

### DEC Free LED Program

Completed EMV Fact Sheet

Duke Energy Carolinas' Free LED program is a continuation of the Free CFL program. The transition from CFLs to LEDs occurred in three phases with each phase targeting different customers and featuring differing program design and delivery components.

Date	August 18, 2017
Region(s)	Duke Energy Carolinas
Evaluation Period	February 2016 through April 2017
Gross Annual kWh impact	96,396 kWh 112% realization rate
Coincident kW impact	127% realization rate (summer) 171% realization rate (winter)
Measure life	12 years
Net to Gross	50%
Process Evaluation	Yes
Previous Evaluation(s)	November 10, 2015

### Evaluation Methodology

The Evaluation Team reviewed reported savings assumptions and verified that the inputs used to calculate those assumptions were in line with the previous evaluation's recommendations. The Evaluation Team also performed an engineering analysis of energy and demand savings to develop ex post savings estimates, including estimation of a net-to-gross ratio (NTGR) and first-year in-service rate (ISR) through a participant survey. The Evaluation Team also conducted a program process evaluation including results from participant and general population surveys.

### Impact Evaluation Details

- North Carolina Utilities Commission requires that evaluations of DEC's Energy Efficient Lighting program include Carolinas-specific data
- North Carolina Utilities Commission requires that evaluations of DEC's Energy Efficient Lighting program include a discussion of the impacts of LEDs, the Energy Independence and Security Act (EISA), and other innovations in lighting technology on the calculations of measure impacts and the baseline measures used in those calculations
- The Evaluation Team estimates baseline wattages using the equivalent baseline wattage approach and recent regionally specific research
- The Evaluation Team estimates hours of use (HOU) and coincidence factors (CF) for program LEDs through metering of a representative sample of the DEC and DEP customers
- The Evaluation Team uses the Uniform Methods Project (UMP) recommended approach to estimate gross energy savings, and incorporates additional adjustments as necessary
- The Evaluation team relied on a participant research to estimate first-year in-service rate (ISR) and net-to-gross ratio (NTGR)
- The Evaluation Team used discounted approach to claiming savings from future LED installations which includes claiming the savings from all expected installations in the program year but discounting them by a utility discount rate

**For more information, please contact:**

**Kessie Avseikova**  
**Director**

617 492 1400 tel  
617 497 7944 fax  
kavseikova@opiniondynamics.com

1000 Winter St  
Waltham, MA 02451



**Boston | Headquarters**

617 492 1400 tel  
617 497 7944 fax  
800 966 1254 toll free

1000 Winter St  
Waltham, MA 02451

**San Francisco Bay**

510 444 5050 tel  
510 444 5222 fax

1999 Harrison Street  
Suite 1420  
Oakland, CA 94612

**Salt Lake City, UT**

385 375 8802 tel  
801 335 6544 fax

3006 Highland Drive  
Suite 100  
Orem, UT 84057



Opinion **Dynamics**



# Duke Energy Carolinas

## Energy Efficient Appliances and Devices Program Appendices

December 8, 2017



## **Contributors**

**Tami Buhr**  
Vice President, Opinion Dynamics

**Kessie Avseikova**  
Director, Opinion Dynamics

**Kai Zhou**  
Managing Consultant, Opinion Dynamics

**Brendon Donoghue**  
Associate Consultant, Opinion Dynamics



Table of Contents

Appendix A. Detailed Analysis Tables..... 4

Appendix B. Chart with Measure-Level Inputs for Duke Energy Analytics..... 5

Appendix C. Detailed Survey Results ..... 6

Appendix D. Participant Survey Instrument .....108

Appendix E. Detailed Overview of the Net-to-Gross Algorithm.....127

Appendix F. Participant Survey Data Package .....133

Appendix G. In-Service Rate, Free-Ridership, and Spillover Calculations .....134



Table of Tables

Table E-1. S0 Savings Assumptions.....131

Table E-2. S0 Savings Summary .....132

Table E-3. S0 Rate Estimate.....132



## Appendix A. Detailed Analysis Tables

The Excel spreadsheet is provided as a separate submission and contains detailed analysis of program gross and net impacts. The data in the file are at the kit configuration and month and year of shipment levels. The file contains ex ante savings, all of the gross savings assumptions, ex post gross savings, NTGR, ex post net savings, and recommended gross savings.

## Appendix B. Chart with Measure-Level Inputs for Duke Energy Analytics

The Excel spreadsheet is provided as a separate submission and contains measure-level inputs for Duke Energy Analytics. Note that Duke Energy plans to apply the measure-level inputs starting in May, 2017.

## Appendix C. Detailed Survey Results

This Appendix contains detailed survey results from the participant survey effort. We provide results in the form of the Wincross tables with a breakdown of the survey results across core customer demographic and household characteristics.

# Appendix C. Detailed Survey Results

## DEC Free LED Detailed Participant Survey Results

### TABLE OF CONTENTS

#### Banner 1

Table qiv1	Page 1	Our records indicate that in <MONTH> of <YEAR>, you received [IF DUP=0: a free LED bulb kit] [IF DUP>0: free LED bulb kits] with <LED_QTY> LED light bulbs from Duke Energy. Is that correct?
Table qiv1b	Page 2	How many LEDs did you receive from Duke Energy?
Table qblpa	Page 3	An incandescent bulb is a traditional light bulb that has been available for 100 years. Would you say you...
Table qblpb	Page 4	A halogen bulb looks similar to an incandescent light bulb. The exterior of a halogen bulb looks like an incandescent bulb but the interior contains a little capsule that produces the light.
Table qblpc	Page 5	A CFL bulb, also known as a compact fluorescent lamp, is commonly made with a glass tube bent into a spiral shape resembling soft-serve ice cream. Some CFLs may have a plastic or glass cover over the spiral tube.
Table qb2p	Page 6	The free light bulbs you received from Duke Energy are called LEDs. An LED bulb often has a plastic base, sometimes with ridges. LEDs are the newest type of light bulb on the market. Prior to receiving the free LEDs from Duke Energy, had you..?
Table qb3	Page 7	Thinking about all of the light sockets in your home in which you could use a LED, how many of them contained LEDs before you received the free ones from Duke Energy?
Table qiv2	Page 8	Have you installed all, some, or none of the LEDs you received from Duke Energy?
Table qiv2a	Page 9	How many of the LEDs that you had received from Duke Energy did you install?
Table qiv3	Page 11	Where did you install the bulbs that you received from Duke Energy?
Table qiv3a	Page 12	Does Duke Energy provide service at your home?
Table qiv3b	Page 13	Where else did you install the bulbs that you received from Duke Energy?
Table qiv3c	Page 14	Does Duke Energy provide service at the other location(s) that you installed your bulb(s)?
Table qiv4	Page 15	Why haven't you installed all of the free LEDs you received?
Table qiv5	Page 16	What did you do with the LED(s) you did not install?
Table qiv6	Page 17	Have you removed any of the free LEDs that you installed?
Table qiv6a	Page 18	How many of the <INSTALLED QUANTITY> LEDs have you removed?
Table qiv7aa	Page 19	Was the free LED that you removed working or was it broken?
Table qiv7ab	Page 20	Were the free LEDs that you removed working or were they broken?
Table qiv7b	Page 21	What did you do with the working LED(s) you removed?
Table qiv8	Page 22	Why did you remove the bulbs?

## Appendix C. Detailed Survey Results

### DEC Free LED Detailed Participant Survey Results

#### TABLE OF CONTENTS

Table qrl	Page 23	I am interested in the types of bulbs that were in the sockets before you installed the free LEDs in them. Did you have any CFLs or LEDs in any of those sockets?
Table qr2	Page 24	How many of the <INSTALLED QUANTITY> sockets where you installed the free LEDs had CFLs or LEDs in them?
Table qr3	Page 26	Were any of the sockets where you installed the free LEDs empty at the time you installed the free LEDs in them?
Table qr3a	Page 27	How many of the sockets where you installed the free LEDs were empty?
Table qr4	Page 28	At the time that you installed the free LED(s), were any of the bulbs you replaced with free LEDs still working or had all of them burnt out?
Table qfr1	Page 29	When you purchase light bulbs, do you generally purchase the lowest priced bulb, or do you consider other factors, such as energy efficiency, quality of light, or longevity of the bulb a factor in your decision?
Table qfr2	Page 30	If you had not received the <RECEIVED QUANTITY> LEDs from Duke Energy, what would you have purchased the next time you needed to buy light bulbs?
Table qfr3	Page 31	Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would you have still purchased CFLs, or would you have purchased a different type of light bulb?
Table qfr4	Page 32	Would you have purchased all <RECEIVED QUANTITY> LEDs or just some at full retail price of \$<LEDBULBCOST> per bulb?
Table qfr5	Page 33	How many of the <RECEIVED QUANTITY> LEDs would you have purchased at the full retail price of \$<LEDBULBCOST> per bulb?
Table qfr6	Page 35	Just to make sure I recorded everything accurately, you are telling me that of the <RECEIVED QUANTITY> LEDs that you received from Duke Energy, you would have purchased <FR5 ANSWER> LEDs, which means that you would not have purchased <RECEIVED QUANTITY-FR5 ANSWER>. Is that correct?
Table qfr7	Page 36	For these <RECEIVED QUANTITY-FR5 ANSWER> bulbs, would you have still purchased LEDs but have done it later, or would you have purchased a different type of light bulb instead of LEDs?
Table qfr7a	Page 37	What type(s) of light bulbs would you have purchased instead of LEDs?
Table qfr7b	Page 38	Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would CFLs still have been a part of the mix?
Table qfr8	Page 39	What types of bulbs would likely have been in the mix?
Table qfr9	Page 40	Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would CFLs still have been a part of the mix?
Table qfr10	Page 41	Earlier, you indicated that you replaced working light bulbs with the LEDs you received for free from Duke Energy. If you had not received the free LEDs from Duke Energy, would you have still replaced these working light bulbs with LEDs, or would you have waited until they burnt out?

Appendix C. Detailed Survey Results

DEC Free LED Detailed Participant Survey Results

TABLE OF CONTENTS

Table qso1	Page 42	Besides the free LEDs you received from Duke Energy, have you or anyone in your household purchased light bulbs in the past year?
Table qso2	Page 43	Did you purchase these light bulbs before or after you received the free LEDs from Duke Energy?
Table qso3	Page 44	What types of light bulbs did you purchase in the past year?
Table qso4	Page 45	Approximately how many CFLs or LEDs did you purchase after you received the free LEDs from Duke Energy?
Table qso5	Page 47	Did your experience with the free LEDs you received from Duke Energy encourage you IN ANY WAY to purchase the additional CFLs or LEDs?
Table qso6	Page 48	How influential was your experience with the free LEDs you received from Duke Energy on your decision to purchase the additional CFLs or LEDs?
Table qmi1	Page 50	How did you first learn you could receive free LEDs from Duke Energy?
Table qmi2	Page 51	Have you ever logged into your online residential account with Duke Energy?
Table qmi3	Page 52	Have you ever received a notification that free LEDs were available while you were logged into your online account?
Table qmi4	Page 53	Did you request free LEDs as a result of this notification?
Table qmi5	Page 54	Before ordering your LEDs, did you receive any materials from Duke Energy about the cost savings on your energy bill from installing more energy efficient lighting?
Table qmi6	Page 55	Did you request the free LEDs from Duke Energy as a result of what you learned from these materials?
Table qmi7	Page 56	Besides providing you free LEDs to use in your home, are you aware of any offerings from Duke Energy that can help you save energy in your home?
Table qmi8	Page 57	What offerings were you aware of?
Table qmi10	Page 58	When did you find out about these offerings?
Table qmi11	Page 59	Did you participate in any of these offerings?
Table qmi12	Page 60	In which offering(s) did you participate?
Table qmi13	Page 61	Prior to taking this survey, were you aware that Duke Energy has an online store where customers can purchase LED bulbs at discounted prices?
Table qs1	Page 62	From the time you requested free LEDs from Duke Energy, approximately how long did it take for you to receive your bulbs in the mail?
Table qs2	Page 64	How satisfied were you with how long it took to receive the free LEDs?
Table qs3	Page 66	After you received your free LEDs from Duke Energy, how often did you contact Duke Energy or program staff with questions?

# Appendix C. Detailed Survey Results

## DEC Free LED Detailed Participant Survey Results

### TABLE OF CONTENTS

Table qs4	Page 67	How did you contact them?
Table qs4a	Page 68	Why did you contact Duke Energy?
Table qs5	Page 69	And how satisfied were you with your communications with Duke Energy and program staff?
Table qs7	Page 71	Have you noticed any savings on your electric bill since installing your free LED(s)?
Table qs8	Page 72	How satisfied are you with any savings you noticed on your electric bill since installing your free LEDs?
Table qs9	Page 74	How satisfied are you with your new free LEDs?
Table qs11	Page 76	Finally, how satisfied with your experience receiving free LEDs from Duke Energy are you overall?
Table qs13	Page 78	Based on your overall experience with Duke Energy's service, how satisfied are you with having them as your electric company?
Table qd1	Page 80	Which of the following best describes your home/residence?
Table qd1a	Page 81	Is your home a factory manufactured or modular home?
Table qd1b	Page 82	How many housing units/apartments are in your building?
Table qd2	Page 83	Do you own or rent this residence?
Table qd2a	Page 84	Do you pay your own electric bill or is it included in your rent?
Table qd3	Page 85	How long have you lived in this residence?
Table qd4	Page 86	Including yourself, how many people currently live in your residence year-round?
Table qd5	Page 87	How many people under the age of 18 live in your residence?
Table qd6	Page 89	Approximately when was your residence first built?
Table qd7	Page 91	Approximately how many square feet is your residence?
Table qd8	Page 92	Would you estimate the square footage of your residence to be...
Table qd9	Page 93	In what year were you born?
Table qd10	Page 94	What is your highest level of education?
Table qd11	Page 95	What best describes your current employment status?
Table qd12	Page 96	Which category best represents your total annual pre-tax household income in <Last Whole Year>?

Appendix C. Detailed Survey Results

Table qiv1 Page 1

DEC Free LED Detailed Participant Survey Results

Our records indicate that in <MONTH> of <YEAR>, you received [IF DUP=0: a free LED bulb kit] [IF DUP>0: free LED bulb kits] with <LED\_QTY> LED light bulbs from Duke Energy. Is that correct?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-	>3,000	<35	35-	55+	<Coll	Coll+	<50K	50K-	100K+
											3,000			(N)					(O)	
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Yes, both quantity and date are correct	474 98.3	358 98.4	27 96.4	86 98.9	289 99.0	182 97.3	118 100.0 I	172 98.9	175 96.7	300 98.7	87 98.9	34 97.1	129 97.7	158 98.1	167 98.8	234 97.9	233 98.7	194 97.5	160 98.8	88 98.9
No, quantity is correct but the date is wrong	1 0.2	-	-	1 1.1	-	1 0.5	-	-	1 0.6	1 0.3	-	-	-	1 0.6	-	-	1 0.4	-	1 0.6	-
No, date is correct, but quantity is wrong	7 1.5	6 1.6	1 3.6	-	3 1.0	4 2.1	-	2 1.1	5 2.8	3 1.0	1 1.1	1 2.9	3 2.3	2 1.2	2 1.2	5 2.1	2 0.8	5 2.5	1 0.6	1 1.1
No, both quantity and date are wrong	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No, I did not receive any LEDs from Duke Energy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qiv1b Page 2

DEC Free LED Detailed Participant Survey Results

How many LEDs did you receive from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	7 100.0	6 100.0	1 100.0	-	3 100.0	4 100.0	-	2 100.0	5 100.0	3 100.0	1 100.0	1 100.0	3 100.0	2 100.0	2 100.0	5 100.0	2 100.0	5 100.0	1 100.0	1 100.0
6	1 14.3	1 16.7	-	-	1 33.3	-	-	-	1 20.0	1 33.3	-	-	-	1 50.0	-	1 20.0	-	1 20.0	-	-
8	2 28.6	2 33.3	-	-	1 33.3	1 25.0	-	-	2 40.0	-	1 100.0	1 100.0	-	1 50.0	1 50.0	1 20.0	1 50.0	1 20.0	-	1 100.0
10	1 14.3	1 16.7	-	-	-	1 25.0	-	1 50.0	-	-	-	-	1 33.3	-	-	1 20.0	-	1 20.0	-	-
12	1 14.3	1 16.7	-	-	1 33.3	-	-	-	1 20.0	-	-	-	-	-	1 50.0	-	1 50.0	1 20.0	-	-
15	1 14.3	-	1 100.0	-	-	1 25.0	-	-	1 20.0	1 33.3	-	-	1 33.3	-	-	1 20.0	-	1 20.0	-	-
18	1 14.3	1 16.7	-	-	-	1 25.0	-	1 50.0	-	1 33.3	-	-	1 33.3	-	-	1 20.0	-	-	1 100.0	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	11.00	10.33	15.00	-	8.67	12.75	-	14.00	9.80	13.00	8.00	8.00	14.33	7.00	10.00	11.40	10.00	10.20	18.00	8.00

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qblpa Page 3

DEC Free LED Detailed Participant Survey Results

An incandescent bulb is a traditional light bulb that has been available for 100 years. Would you say you...

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Have used or currently use this type of light bulb?	465	353	28	81	288	174	113	168	175	293	85	35	127	157	162	228	230	189	157	88
	96.5	97.0	100.0	93.1	98.6	93.0	95.8	96.6	96.7	96.4	96.6	100.0	96.2	97.5	95.9	95.4	97.5	95.0	96.9	98.9
			BD		F							JK							R	
Have heard of this type of light bulb but have never used it?	14	9	-	5	4	10	5	4	5	9	3	-	5	3	5	8	6	8	5	1
	2.9	2.5		5.7	1.4	5.3	4.2	2.3	2.8	3.0	3.4		3.8	1.9	3.0	3.3	2.5	4.0	3.1	1.1
					E															
Or have not heard of this type of light bulb before today?	3	2	-	1	-	3	-	2	1	2	-	-	-	1	2	3	-	2	-	-
	0.6	0.5		1.1		1.6		1.1	0.6	0.7				0.6	1.2	1.3		1.0		
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qblpb Page 4

DEC Free LED Detailed Participant Survey Results

A halogen bulb looks similar to an incandescent light bulb. The exterior of a halogen bulb looks like an incandescent bulb but the interior contains a little capsule that produces the light.

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Have used or currently use this type of light bulb?	320 66.4	257 70.6	16 57.1	46 52.9	212 72.6	105 56.1	65 55.1	118 67.8	130 71.8	201 66.1	63 71.6	27 77.1	81 61.4	113 70.2	111 65.7	155 64.9	160 67.8	106 53.3	124 76.5	66 74.2
Have heard of this type of light bulb but have never used it?	138 28.6	89 24.5	12 42.9	35 40.2	71 24.3	67 35.8	45 38.1	46 26.4	45 24.9	90 29.6	23 26.1	6 17.1	45 34.1	42 26.1	47 27.8	67 28.0	70 29.7	76 38.2	36 22.2	21 23.6
Or have not heard of this type of light bulb before today?	23 4.8	18 4.9	-	5 5.7	9 3.1	14 7.5	7 5.9	10 5.7	6 3.3	12 3.9	2 2.3	2 5.7	6 4.5	6 3.7	10 5.9	16 6.7	6 2.5	16 8.0	2 1.2	2 2.2
Don't know/Not sure	1 0.2	-	-	1 1.1	-	1 0.5	1 0.8	-	-	1 0.3	-	-	-	-	1 0.6	1 0.4	-	1 0.5	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qblpc Page 5

DEC Free LED Detailed Participant Survey Results

A CFL bulb, also known as a compact fluorescent lamp, is commonly made with a glass tube bent into a spiral shape resembling soft-serve ice cream. Some CFLs may have a plastic or glass cover over the spiral tube.

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Have used or currently use this type of light bulb?	428 88.8	331 90.9	23 82.1	72 82.8	269 92.1	156 83.4	100 84.7	153 87.9	166 91.7	272 89.5	81 92.0	32 91.4	114 86.4	146 90.7	149 88.2	208 87.0	213 90.3	164 82.4	151 93.2	82 92.1
		D			F				G										R	R
Have heard of this type of light bulb but have never used it?	44 9.1	26 7.1	4 14.3	13 14.9	20 6.8	24 12.8	15 12.7	19 10.9	10 5.5	25 8.2	7 8.0	2 5.7	14 10.6	10 6.2	19 11.2	26 10.9	18 7.6	28 14.1	9 5.6	7 7.9
				B		E	I	I										ST		
Or have not heard of this type of light bulb before today?	10 2.1	7 1.9	1 3.6	2 2.3	3 1.0	7 3.7	3 2.5	2 1.1	5 2.8	7 2.3	-	1 2.9	4 3.0	5 3.1	1 0.6	5 2.1	5 2.1	7 3.5	2 1.2	-
						E								O						
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qb2p Page 6

DEC Free LED Detailed Participant Survey Results

The free light bulbs you received from Duke Energy are called LEDs. An LED bulb often has a plastic base, sometimes with ridges. LEDs are the newest type of light bulb on the market. Prior to receiving the free LEDs from Duke Energy, had you..?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Used this type of light bulb	234	189	9	34	155	77	47	87	98	139	51	22	59	82	83	102	130	75	81	61
	48.5	51.9	32.1	39.1	53.1	41.2	39.8	50.0	54.1	45.7	58.0	62.9	44.7	50.9	49.1	42.7	55.1	37.7	50.0	68.5
		CD			F			G	G		J	J					P		R	RS
Heard of this type of light bulb but had never used it	216	157	14	44	129	86	63	73	73	147	35	11	63	69	74	114	97	101	76	25
	44.8	43.1	50.0	50.6	44.2	46.0	53.4	42.0	40.3	48.4	39.8	31.4	47.7	42.9	43.8	47.7	41.1	50.8	46.9	28.1
							HI			L								T	T	
Or had you not heard of this type of light bulb	32	18	5	9	8	24	8	14	10	18	2	2	10	10	12	23	9	23	5	3
	6.6	4.9	17.9	10.3	2.7	12.8	6.8	8.0	5.5	5.9	2.3	5.7	7.6	6.2	7.1	9.6	3.8	11.6	3.1	3.4
			B			E				K						Q		ST		
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qb3 Page 7

DEC Free LED Detailed Participant Survey Results

Thinking about all of the light sockets in your home in which you could use a LED, how many of them contained LEDs before you received the free ones from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	234 100.0	189 100.0	9 100.0	34 100.0	155 100.0	77 100.0	47 100.0	87 100.0	98 100.0	139 100.0	51 100.0	22 100.0	59 100.0	82 100.0	83 100.0	102 100.0	130 100.0	75 100.0	81 100.0	61 100.0
All of them	14 6.0	11 5.8	-	3 8.8	10 6.5	4 5.2	3 6.4	3 3.4	8 8.2	9 6.5	3 5.9	1 4.5	2 3.4	6 7.3	6 7.2	9 8.8	5 3.8	7 9.3	3 3.7	4 6.6
Most of them	27 11.5	21 11.1	-	6 17.6	16 10.3	11 14.3	8 17.0	8 9.2	11 11.2	15 10.8	5 9.8	3 13.6	4 6.8	7 8.5	12 14.5	16 15.7 Q	11 8.5	9 12.0	6 7.4	7 11.5
Some of them	70 29.9	59 31.2 C	1 11.1	9 26.5	52 33.5 F	17 22.1	11 23.4	31 35.6	27 27.6	40 28.8	17 33.3	10 45.5	18 30.5	25 30.5	24 28.9	24 23.5	45 34.6 P	23 30.7	23 28.4	19 31.1
A few of them	88 37.6	71 37.6	7 77.8 BD	10 29.4	59 38.1	28 36.4	21 44.7	31 35.6	35 35.7	51 36.7	21 41.2	6 27.3	24 40.7	29 35.4	32 38.6	32 31.4	55 42.3 P	24 32.0	35 43.2	23 37.7
None of them	35 15.0	27 14.3	1 11.1	6 17.6	18 11.6	17 22.1 E	4 8.5	14 16.1	17 17.3	24 17.3	5 9.8	2 9.1	11 18.6	15 18.3	9 10.8	21 20.6 Q	14 10.8	12 16.0	14 17.3	8 13.1
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv2 Page 8

DEC Free LED Detailed Participant Survey Results

Have you installed all, some, or none of the LEDs you received from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
All of them	169 35.1	127 34.9	15 53.6 BD	27 31.0	107 36.6	62 33.2	29 24.6	65 37.4 G	73 40.3 G	101 33.2	41 46.6 J	12 34.3	48 36.4	61 37.9	55 32.5	95 39.7 Q	73 30.9	66 33.2	63 38.9	31 34.8
Some of them	291 60.4	217 59.6	13 46.4	58 66.7 C	169 57.9	119 63.6	86 72.9 HI	97 55.7	102 56.4	189 62.2 K	44 50.0	21 60.0	77 58.3	94 58.4	107 63.3	138 57.7	147 62.3	126 63.3	90 55.6	55 61.8
None of them	21 4.4	19 5.2	-	2 2.3	15 5.1	6 3.2	3 2.5	11 6.3	6 3.3	13 4.3	3 3.4	2 5.7	7 5.3	6 3.7	6 3.6	6 2.5	15 6.4 P	7 3.5	9 5.6	2 2.2
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	1 0.2	1 0.3	-	-	1 0.3	-	-	1 0.6	-	1 0.3	-	-	-	-	1 0.6	-	1 0.4	-	-	1 1.1

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv2a Page 9

DEC Free LED Detailed Participant Survey Results

How many of the LEDs that you had received from Duke Energy did you install?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	291 100.0	217 100.0	13 100.0	58 100.0	169 100.0	119 100.0	86 100.0	97 100.0	102 100.0	189 100.0	44 100.0	21 100.0	77 100.0	94 100.0	107 100.0	138 100.0	147 100.0	126 100.0	90 100.0	55 100.0
1	12 4.1	9 4.1	-	3 5.2	8 4.7	4 3.4	6 7.0 I	5 5.2 I	1 1.0	8 4.2	2 4.5	1 4.8	3 3.9	3 3.2	6 5.6	5 3.6	7 4.8	6 4.8	4 4.4	1 1.8
2	26 8.9	17 7.8	-	9 15.5	14 8.3	12 10.1	10 11.6	7 7.2	9 8.8	18 9.5	4 9.1	1 4.8	10 13.0	6 6.4	10 9.3	10 7.2	16 10.9	14 11.1	8 8.9	4 7.3
3	34 11.7	23 10.6	3 23.1	8 13.8	22 13.0	12 10.1	11 12.8	13 13.4	10 9.8	24 12.7	5 11.4	1 4.8	10 13.0	9 9.6	14 13.1	20 14.5	14 9.5	16 12.7	11 12.2	5 9.1
4	38 13.1	31 14.3	-	7 12.1	24 14.2	14 11.8	11 12.8	19 19.6 I	6 5.9	28 14.8	6 13.6	3 14.3	9 11.7	8 8.5	19 17.8 N	20 14.5	17 11.6	16 12.7	12 13.3	6 10.9
5	33 11.3	26 12.0	-	7 12.1	16 9.5	17 14.3	11 12.8	10 10.3	12 11.8	21 11.1	3 6.8	7 33.3 JK	10 13.0	11 11.7	10 9.3	12 8.7	20 13.6	9 7.1	13 14.4 R	8 14.5
6	38 13.1	29 13.4 D	5 38.5 BD	3 5.2	25 14.8	13 10.9	9 10.5	9 9.3	20 19.6 GH	25 13.2	5 11.4	3 14.3	9 11.7	15 16.0	11 10.3	20 14.5	18 12.2	17 13.5	8 8.9	9 16.4
7	17 5.8	11 5.1	1 7.7	5 8.6	9 5.3	8 6.7	8 9.3 I	7 7.2 I	2 2.0	10 5.3	4 9.1	-	3 3.9	3 3.2	10 9.3 N	11 8.0	6 4.1	12 9.5 S	3 3.3	2 3.6
8	35 12.0	27 12.4	1 7.7	5 8.6	20 11.8	14 11.8	4 4.7	12 12.4 G	18 17.6 G	24 12.7	5 11.4	1 4.8	8 10.4	17 18.1 O	9 8.4	17 12.3	17 11.6	13 10.3	12 13.3	8 14.5
9	13 4.5	12 5.5 D	-	1 1.7	8 4.7	4 3.4	2 2.3	4 4.1	6 5.9	6 3.2	4 9.1	-	4 5.2	6 6.4	2 1.9	4 2.9	8 5.4	3 2.4	5 5.6	3 5.5

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qiv2a Page 10  
(Continued)  
DEC Free LED Detailed Participant Survey Results

How many of the LEDs that you had received from Duke Energy did you install?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
10	24 8.2	16 7.4	1 7.7	7 12.1	12 7.1	11 9.2	8 9.3 H	3 3.1	11 10.8 H	12 6.3	3 6.8	3 14.3	4 5.2	11 11.7	8 7.5	11 8.0	11 7.5	10 7.9	8 8.9	4 7.3
11	7 2.4	6 2.8	-	1 1.7	4 2.4	3 2.5	2 2.3	3 3.1	2 2.0	3 1.6	2 4.5	-	3 3.9	2 2.1	2 1.9	1 0.7	6 4.1 P	4 3.2	1 1.1	2 3.6
12	9 3.1	6 2.8	1 7.7	2 3.4	4 2.4	5 4.2	2 2.3	4 4.1	3 2.9	6 3.2	1 2.3	-	3 3.9	3 3.2	3 2.8	4 2.9	5 3.4	3 2.4	4 4.4	2 3.6
13	2 0.7	2 0.9	-	-	1 0.6	1 0.8	-	1 1.0	1 1.0	2 1.1	-	-	1 1.3	-	1 0.9	2 1.4	-	1 0.8	1 1.1	-
14	1 0.3	-	1 7.7	-	1 0.6	-	1 1.2	-	-	1 0.5	-	-	-	-	1 0.9	-	1 0.7	1 0.8	-	-
15	1 0.3	1 0.5	-	-	-	1 0.8	1 1.2	-	-	1 0.5	-	-	-	-	1 0.9	1 0.7	-	1 0.8	-	-
20	1 0.3	1 0.5	-	-	1 0.6	-	-	-	1 1.0	-	-	1 4.8	-	-	-	-	1 0.7	-	-	1 1.8
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	5.93	5.99	6.92	5.43	5.81	6.03	5.50	5.60	6.53 GH	5.71	5.95	6.14	5.66	6.36 O	5.61	5.83	5.97	5.79	5.87	6.42

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv3 Page 11

DEC Free LED Detailed Participant Survey Results

Where did you install the bulbs that you received from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	460	344	28	85	276	181	115	162	175	290	85	33	125	155	162	233	220	192	153	86
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
On the inside of your home	455	339	28	85	272	180	114	159	174	287	83	33	125	153	159	230	218	190	152	84
	98.9	98.5	100.0	100.0	98.6	99.4	99.1	98.1	99.4	99.0	97.6	100.0	100.0	98.7	98.1	98.7	99.1	99.0	99.3	97.7
			B	B								J	O							
On the outside of your home	85	73	6	5	60	25	21	27	36	45	18	9	19	30	32	46	37	37	23	18
	18.5	21.2	21.4	5.9	21.7	13.8	18.3	16.7	20.6	15.5	21.2	27.3	15.2	19.4	19.8	19.7	16.8	19.3	15.0	20.9
		D	D		F															
Someplace else	5	5	-	-	4	1	2	1	2	5	-	-	1	2	2	3	2	3	2	-
	1.1	1.5			1.4	0.6	1.7	0.6	1.1	1.7			0.8	1.3	1.2	1.3	0.9	1.6	1.3	
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv3a Page 12

DEC Free LED Detailed Participant Survey Results

Does Duke Energy provide service at your home?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	459 100.0	343 100.0	28 100.0	85 100.0	275 100.0	181 100.0	115 100.0	161 100.0	175 100.0	289 100.0	85 100.0	33 100.0	125 100.0	154 100.0	162 100.0	233 100.0	219 100.0	192 100.0	152 100.0	86 100.0
Yes	450 98.0	338 98.5	28 100.0 BD	81 95.3	271 98.5	176 97.2	113 98.3	158 98.1	171 97.7	284 98.3	85 100.0 J	33 100.0 J	121 96.8	151 98.1	161 99.4	229 98.3	214 97.7	186 96.9	151 99.3 R	85 98.8
No	4 0.9	2 0.6	-	2 2.4	1 0.4	3 1.7	1 0.9	1 0.6	2 1.1	3 1.0	-	-	1 0.8	2 1.3	-	2 0.9	2 0.9	2 1.0	1 0.7	-
Don't know/Not sure	5 1.1	3 0.9	-	2 2.4	3 1.1	2 1.1	1 0.9	2 1.2	2 1.1	2 0.7	-	-	3 2.4	1 0.6	1 0.6	2 0.9	3 1.4	4 2.1	-	1 1.2
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv3b Page 13

DEC Free LED Detailed Participant Survey Results

Where else did you install the bulbs that you received from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	5 100.0	5 100.0	-	-	4 100.0	1 100.0	2 100.0	1 100.0	2 100.0	5 100.0	-	-	1 100.0	2 100.0	2 100.0	3 100.0	2 100.0	3 100.0	2 100.0	-
Where you work	3 60.0	3 60.0	-	-	3 75.0	-	1 50.0	1 100.0	1 50.0	3 60.0	-	-	1 100.0	2 100.0	-	1 33.3	2 100.0	2 66.7	1 50.0	-
In someone else's home	1 20.0	1 20.0	-	-	- 100.0	1 100.0	1 50.0	-	-	1 20.0	-	-	-	-	1 50.0	1 33.3	-	1 33.3	-	-
Someplace else, specify	2 40.0	2 40.0	-	-	2 50.0	-	1 50.0	-	1 50.0	2 40.0	-	-	-	1 50.0	1 50.0	1 33.3	1 50.0	1 33.3	1 50.0	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv3c Page 14

DEC Free LED Detailed Participant Survey Results

Does Duke Energy provide service at the other location(s) that you installed your bulb(s)?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	5 100.0	5 100.0	-	-	4 100.0	1 100.0	2 100.0	1 100.0	2 100.0	5 100.0	-	-	1 100.0	2 100.0	2 100.0	3 100.0	2 100.0	3 100.0	2 100.0	-
Yes	3 60.0	3 60.0	-	-	2 50.0	1 100.0	1 50.0	-	2 100.0	3 60.0	-	-	1 100.0	-	2 100.0	3 100.0	-	2 66.7	1 50.0	-
No	1 20.0	1 20.0	-	-	1 25.0	-	-	1 100.0	-	1 20.0	-	-	-	1 50.0	-	-	1 50.0	-	1 50.0	-
Duke Energy provides service to some locations (please specify)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	1 20.0	1 20.0	-	-	1 25.0	-	1 50.0	-	-	1 20.0	-	-	-	1 50.0	-	-	1 50.0	1 33.3	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv4 Page 15

DEC Free LED Detailed Participant Survey Results

Why haven't you installed all of the free LEDs you received?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-	>3,000	<35	35-	55+	<Coll	Coll+	<50K	50K-	100K+
											3,000			54			Coll+		100K	
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	311 100.0	235 100.0	13 100.0	60 100.0	183 100.0	125 100.0	89 100.0	107 100.0	108 100.0	201 100.0	47 100.0	23 100.0	84 100.0	100 100.0	112 100.0	144 100.0	161 100.0	133 100.0	98 100.0	57 100.0
Haven't had the need to install bulbs	105 33.8	74 31.5	3 23.1	27 45.0 B	53 29.0	51 40.8 E	37 41.6 I	35 32.7	28 25.9	75 37.3 L	14 29.8 L	2 8.7	40 47.6 NO	27 27.0	33 29.5	55 38.2	48 29.8	52 39.1 ST	28 28.6	15 26.3
I am waiting for light bulbs to burn out	194 62.4	156 66.4 CD	5 38.5	31 51.7	119 65.0	73 58.4	47 52.8	65 60.7	78 72.2 GH	122 60.7	29 61.7	19 82.6 JK	54 64.3 O	70 70.0 O	59 52.7	84 58.3	106 65.8	77 57.9	63 64.3	41 71.9 R
I don't have a light socket where I use that wattage	14 4.5	10 4.3	1 7.7	2 3.3	6 3.3	8 6.4	4 4.5	8 7.5 I	2 1.9	10 5.0	1 2.1	1 4.3	7 8.3 N	1 1.0	6 5.4 N	5 3.5	9 5.6	7 5.3	2 2.0	5 8.8 S
I don't like LEDs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other, specify	48 15.4	33 14.0	4 30.8	10 16.7	26 14.2	22 17.6	16 18.0	16 15.0	16 14.8	32 15.9	6 12.8	2 8.7	11 13.1	12 12.0	24 21.4 N	23 16.0	24 14.9	25 18.8 T	17 17.3 T	4 7.0
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv5 Page 16

DEC Free LED Detailed Participant Survey Results

What did you do with the LED(s) you did not install?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	311 100.0	235 100.0	13 100.0	60 100.0	183 100.0	125 100.0	89 100.0	107 100.0	108 100.0	201 100.0	47 100.0	23 100.0	84 100.0	100 100.0	112 100.0	144 100.0	161 100.0	133 100.0	98 100.0	57 100.0
Placed them in storage for later use	303 97.4	230 97.9	12 92.3	58 96.7	180 98.4	120 96.0	85 95.5	105 98.1	106 98.1	197 98.0	46 97.9	23 100.0 J	83 98.8	98 98.0	107 95.5	139 96.5	159 98.8	126 94.7	97 99.0 R	57 100.0 R
Threw them away	3 1.0	2 0.9	-	1 1.7	1 0.5	2 1.6	-	1 0.9	2 1.9	2 1.0	-	-	1 1.2	1 1.0	1 0.9	2 1.4	1 0.6	3 2.3	-	-
Gave them away	3 1.0	1 0.4	-	2 3.3	1 0.5	2 1.6	3 3.4	-	-	2 1.0	1 2.1	-	1 1.2	-	2 1.8	1 0.7	1 0.6	2 1.5	1 1.0	-
Other, specify	4 1.3	2 0.9	1 7.7	1 1.7	1 0.5	3 2.4	2 2.2	1 0.9	1 0.9	2 1.0	-	-	-	2 2.0	2 1.8	2 1.4	2 1.2	3 2.3	1 1.0	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv6 Page 17

DEC Free LED Detailed Participant Survey Results

Have you removed any of the free LEDs that you installed?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	460 100.0	344 100.0	28 100.0	85 100.0	276 100.0	181 100.0	115 100.0	162 100.0	175 100.0	290 100.0	85 100.0	33 100.0	125 100.0	155 100.0	162 100.0	233 100.0	220 100.0	192 100.0	153 100.0	86 100.0
Yes	30 6.5	23 6.7	1 3.6	6 7.1	16 5.8	14 7.7	5 4.3	6 3.7	18 10.3 GH	17 5.9	4 4.7	3 9.1	9 7.2	14 9.0 O	7 4.3	18 7.7	12 5.5	17 8.9 S	5 3.3	8 9.3 S
No	430 93.5	321 93.3	27 96.4	79 92.9	260 94.2	167 92.3	110 95.7 I	156 96.3 I	157 89.7	273 94.1	81 95.3	30 90.9	116 92.8	141 91.0	155 95.7 N	215 92.3	208 94.5	175 91.1	148 96.7 RT	78 90.7
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qiv6a Page 18

DEC Free LED Detailed Participant Survey Results

How many of the <INSTALLED QUANTITY> LEDs have you removed?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	29 100.0	22 100.0	1 100.0	6 100.0	16 100.0	13 100.0	4 100.0	6 100.0	18 100.0	16 100.0	4 100.0	3 100.0	8 100.0	14 100.0	7 100.0	17 100.0	12 100.0	16 100.0	5 100.0	8 100.0
1	8 27.6	8 36.4	-	-	6 37.5	2 15.4	2 50.0	2 33.3	4 22.2	5 31.2	3 75.0 J	-	1 12.5	5 35.7	2 28.6	5 29.4	3 25.0	4 25.0	2 40.0	2 25.0
2	4 13.8	3 13.6	-	1 16.7	2 12.5	2 15.4	-	-	4 22.2	3 18.8	-	1 33.3	1 12.5	2 14.3	1 14.3	2 11.8	2 16.7	-	2 40.0	2 25.0
3	2 6.9	1 4.5	1 100.0	-	2 12.5	-	-	1 16.7	1 5.6	-	-	1 33.3	-	-	2 28.6	1 5.9	1 8.3	1 6.2	-	1 12.5
5	2 6.9	2 9.1	-	-	-	2 15.4	-	1 16.7	1 5.6	1 6.2	-	-	2 25.0	-	-	2 11.8	-	2 12.5	-	-
6	1 3.4	-	-	1 16.7	-	1 7.7	-	-	1 5.6	-	-	-	1 12.5	-	-	1 5.9	-	1 6.2	-	-
8	1 3.4	1 4.5	-	-	-	1 7.7	-	-	1 5.6	-	-	-	-	1 7.1	-	1 5.9	-	1 6.2	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	11 37.9	7 31.8	-	4 66.7	6 37.5	5 38.5	2 50.0	2 33.3	6 33.3	7 43.8	1 25.0	1 33.3	3 37.5	6 42.9	2 28.6	5 29.4	6 50.0	7 43.8	1 20.0	3 37.5
Mean	2.56	2.33	3.00	4.00	1.60	3.75 E	1.00	2.50	2.83 G	1.78	1.00	2.50	3.80	2.12	2.00	3.00	1.67	3.44 S	1.50	1.80

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv7aa Page 19

DEC Free LED Detailed Participant Survey Results

Was the free LED that you removed working or was it broken?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	1 100.0	1 100.0	-	-	-	1 100.0	1 100.0	-	-	1 100.0	-	-	1 100.0	-	-	1 100.0	-	1 100.0	-	-
Working	1 100.0	1 100.0	-	-	-	1 100.0	1 100.0	-	-	1 100.0	-	-	1 100.0	-	-	1 100.0	-	1 100.0	-	-
Broken	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv7ab Page 20

DEC Free LED Detailed Participant Survey Results

Were the free LEDs that you removed working or were they broken?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	29 100.0	22 100.0	1 100.0	6 100.0	16 100.0	13 100.0	4 100.0	6 100.0	18 100.0	16 100.0	4 100.0	3 100.0	8 100.0	14 100.0	7 100.0	17 100.0	12 100.0	16 100.0	5 100.0	8 100.0
All were working	14 48.3	9 40.9	1 100.0	4 66.7	7 43.8	7 53.8	1 25.0	3 50.0	9 50.0	8 50.0	- 100.0 J	3 100.0 J	4 50.0	6 42.9	4 57.1	6 35.3	8 66.7 P	8 50.0	2 40.0	4 50.0
All were broken	8 27.6	7 31.8	-	1 16.7	5 31.2	3 23.1	2 50.0	1 16.7	5 27.8	6 37.5	1 25.0	-	1 12.5	5 35.7	2 28.6	6 35.3	2 16.7	4 25.0	3 60.0 T	1 12.5
Some were working and some were broken	7 24.1	6 27.3	-	1 16.7	4 25.0	3 23.1	1 25.0	2 33.3	4 22.2	2 12.5	3 75.0 J	-	3 37.5	3 21.4	1 14.3	5 29.4	2 16.7	4 25.0	-	3 37.5
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv7b Page 21

DEC Free LED Detailed Participant Survey Results

What did you do with the working LED(s) you removed?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	22 100.0	16 100.0	1 100.0	5 100.0	11 100.0	11 100.0	3 100.0	5 100.0	13 100.0	11 100.0	3 100.0	3 100.0	8 100.0	9 100.0	5 100.0	12 100.0	10 100.0	13 100.0	2 100.0	7 100.0
Placed them in storage for later use	14 63.6	10 62.5	1 100.0	3 60.0	6 54.5	8 72.7	1 33.3	3 60.0	9 69.2	8 72.7	2 66.7	1 33.3	6 75.0	6 66.7	2 40.0	9 75.0	5 50.0	8 61.5	2 100.0 RT	4 57.1
Threw them away	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gave them away	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Installed them somewhere besides my home	3 13.6	3 18.8	-	-	3 27.3	-	-	-	3 23.1	2 18.2	-	1 33.3	-	2 22.2	1 20.0	-	3 30.0	2 15.4	-	1 14.3
Installed elsewhere in my home	4 18.2	3 18.8	-	1 20.0	3 27.3	1 9.1	-	2 40.0	2 15.4	-	1 33.3	2 66.7	2 25.0	1 11.1	1 20.0	1 8.3	3 30.0	1 7.7	-	3 42.9 R
Other, specify	3 13.6	2 12.5	-	1 20.0	1 9.1	2 18.2	2 66.7 I	-	1 7.7	2 18.2	-	-	-	2 22.2	1 20.0	2 16.7	1 10.0	3 23.1	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qiv8 Page 22

DEC Free LED Detailed Participant Survey Results

Why did you remove the bulbs?

	Why did you remove the bulbs?																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	30 100.0	23 100.0	1 100.0	6 100.0	16 100.0	14 100.0	5 100.0	6 100.0	18 100.0	17 100.0	4 100.0	3 100.0	9 100.0	14 100.0	7 100.0	18 100.0	12 100.0	17 100.0	5 100.0	8 100.0
Do not like light quality, not bright enough, too bright	8 26.7	6 26.1	-	2 33.3	3 18.8	5 35.7	1 20.0	2 33.3	4 22.2	6 35.3	-	2 66.7	4 44.4	3 21.4	1 14.3	2 11.1	6 50.0 P	3 17.6	2 40.0	3 37.5
Do not like appearance of bulb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bulbs stopped working, burned out	15 50.0	12 52.2	1 100.0	2 33.3	7 43.8	8 57.1	2 40.0	4 66.7	9 50.0	9 52.9	2 50.0	-	4 44.4	6 42.9	5 71.4	12 66.7 Q	3 25.0	10 58.8 T	3 60.0	2 25.0
Bulbs never worked	2 6.7	1 4.3	-	1 16.7	1 6.2	1 7.1	-	-	2 11.1	-	-	1 33.3	1 11.1	-	1 14.3	1 5.6	1 8.3	1 5.9	-	1 12.5
Other, specify	7 23.3	6 26.1	-	1 16.7	6 37.5 F	1 7.1	2 40.0	-	5 27.8	3 17.6	2 50.0	1 33.3	1 11.1	6 42.9 M	-	4 22.2	3 25.0	4 23.5	-	3 37.5
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qrl Page 23

DEC Free LED Detailed Participant Survey Results

I am interested in the types of bulbs that were in the sockets before you installed the free LEDs in them. Did you have any CFLs or LEDs in any of those sockets?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	424 100.0	322 100.0	25 100.0	74 100.0	261 100.0	160 100.0	102 100.0	148 100.0	166 100.0	269 100.0	79 100.0	32 100.0	111 100.0	146 100.0	150 100.0	212 100.0	205 100.0	166 100.0	146 100.0	83 100.0
Yes	238 56.1	185 57.5	16 64.0	35 47.3	155 59.4	80 50.0	56 54.9	89 60.1	88 53.0	147 54.6	46 58.2	21 65.6	60 54.1	78 53.4	87 58.0	111 52.4	122 59.5	82 49.4	85 58.2	51 61.4
No	185 43.6	137 42.5	9 36.0	38 51.4	106 40.6	79 49.4	45 44.1	59 39.9	78 47.0	121 45.0	33 41.8	11 34.4	51 45.9	68 46.6	62 41.3	100 47.2	83 40.5	83 50.0	61 41.8	32 38.6
Don't know/Not sure	1 0.2	-	-	1 1.4	-	1 0.6	1 1.0	-	-	1 0.4	-	-	-	-	1 0.7	1 0.5	-	1 0.6	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qr2 Page 24

DEC Free LED Detailed Participant Survey Results

How many of the <INSTALLED QUANTITY> sockets where you installed the free LEDs had CFLs or LEDs in them?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)
Total	238 100.0	185 100.0	16 100.0	35 100.0	155 100.0	80 100.0	56 100.0	89 100.0	88 100.0	147 100.0	46 100.0	21 100.0	60 100.0	78 100.0	87 100.0	111 100.0	122 100.0	82 100.0	85 100.0	51 100.0
1	22 9.2	18 9.7	2 12.5	2 5.7	15 9.7	7 8.8	6 10.7	11 12.4	5 5.7	14 9.5	3 6.5	3 14.3	4 6.7	7 9.0	10 11.5	7 6.3	15 12.3	7 8.5	9 10.6	5 9.8
2	36 15.1	27 14.6	1 6.2	8 22.9 C	26 16.8	9 11.2	10 17.9	15 16.9	10 11.4	22 15.0	7 15.2	5 23.8	8 13.3	13 16.7	14 16.1	9 8.1	27 22.1 P	12 14.6	10 11.8	11 21.6
3	35 14.7	28 15.1	3 18.8	4 11.4	26 16.8	9 11.2	8 14.3	16 18.0	11 12.5	22 15.0	6 13.0	4 19.0	5 8.3	14 17.9 M	14 16.1	14 12.6	21 17.2	10 12.2	12 14.1	10 19.6
4	31 13.0	23 12.4	2 12.5	6 17.1	20 12.9	10 12.5	12 21.4 I	10 11.2	8 9.1	22 15.0	4 8.7	2 9.5	9 15.0	8 10.3	11 12.6	19 17.1 Q	10 8.2	12 14.6	11 12.9	4 7.8
5	22 9.2	18 9.7	-	3 8.6	13 8.4	9 11.2	2 3.6	7 7.9	13 14.8 G	10 6.8	8 17.4 JL	1 4.8	8 13.3	7 9.0	5 5.7	7 6.3	14 11.5	4 4.9	9 10.6	6 11.8
6	21 8.8	16 8.6	3 18.8	2 5.7	16 10.3	5 6.2	6 10.7	7 7.9	8 9.1	11 7.5	5 10.9	1 4.8	4 6.7	7 9.0	9 10.3	12 10.8	9 7.4	7 8.5	5 5.9	7 13.7
7	5 2.1	3 1.6	-	2 5.7	2 1.3	3 3.8	3 5.4	2 2.2	-	3 2.0	1 2.2	-	1 1.7	-	4 4.6	3 2.7	2 1.6	3 3.7	2 2.4	-
8	17 7.1	10 5.4	1 6.2	5 14.3	5 3.2	11 13.8 E	1 1.8	5 5.6	9 10.2 G	12 8.2	2 4.3	1 4.8	7 11.7 O	6 7.7	2 2.3	9 8.1	7 5.7	7 8.5	6 7.1	2 3.9
9	8 3.4	6 3.2	-	2 5.7	5 3.2	3 3.8	2 3.6	2 2.2	4 4.5	6 4.1	1 2.2	-	4 6.7	2 2.6	2 2.3	5 4.5	3 2.5	3 3.7	3 3.5	1 2.0

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qr2 Page 25  
(Continued)  
DEC Free LED Detailed Participant Survey Results

How many of the <INSTALLED QUANTITY> sockets where you installed the free LEDs had CFLs or LEDs in them?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
10	9 3.8	8 4.3	1 6.2	-	6 3.9	3 3.8	-	4 4.5	4 4.5	4 2.7	3 6.5	1 4.8	3 5.0	1 1.3	4 4.6	6 5.4	2 1.6	2 2.4	3 3.5	3 5.9
11	2 0.8	1 0.5	1 6.2	-	2 1.3	-	1 1.8	-	1 1.1	1 0.7	-	1 4.8	-	1 1.3	1 1.1	-	2 1.6	1 1.2	1 1.2	-
12	9 3.8	9 4.9	-	-	6 3.9	3 3.8	3 5.4	2 2.2	4 4.5	6 4.1	1 2.2	1 4.8	2 3.3	4 5.1	3 3.4	5 4.5	4 3.3	3 3.7	6 7.1	-
14	2 0.8	1 0.5	-	1 2.9	1 0.6	1 1.2	-	-	2 2.3	2 1.4	-	-	-	2 2.6	-	2 1.8	-	1 1.2	1 1.2	-
15	18 7.6	16 8.6	2 12.5	-	12 7.7	6 7.5	2 3.6	7 7.9	9 10.2	11 7.5	5 10.9	1 4.8	4 6.7	6 7.7	8 9.2	12 10.8 Q	6 4.9	10 12.2 T	6 7.1	2 3.9
18	1 0.4	1 0.5	-	-	-	1 1.2	-	1 1.1	-	1 0.7	-	-	1 1.7	-	-	1 0.9	-	-	1 1.2	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	5.62	5.73	6.12	4.77	5.37	6.14	4.79	5.22	6.51 GH	5.67	5.87	4.76	6.10	5.60	5.43	6.61 Q	4.70	6.17 T	5.98 T	4.51

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qr3 Page 26

DEC Free LED Detailed Participant Survey Results

Were any of the sockets where you installed the free LEDs empty at the time you installed the free LEDs in them?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	352 100.0	252 100.0	23 100.0	75 100.0	203 100.0	147 100.0	85 100.0	117 100.0	144 100.0	224 100.0	62 100.0	25 100.0	100 100.0	126 100.0	113 100.0	174 100.0	174 100.0	148 100.0	118 100.0	66 100.0
Yes	57 16.2	37 14.7	8 34.8 BD	12 16.0	25 12.3	32 21.8 E	17 20.0	14 12.0	25 17.4	30 13.4	9 14.5	4 16.0	22 22.0 NO	17 13.5	15 13.3	34 19.5	23 13.2	34 23.0 ST	14 11.9	7 10.6
No	295 83.8	215 85.3 C	15 65.2	63 84.0 C	178 87.7	115 78.2 F	68 80.0	103 88.0	119 82.6	194 86.6	53 85.5	21 84.0	78 78.0	109 86.5 M	98 86.7 M	140 80.5	151 86.8	114 77.0	104 88.1 R	59 89.4 R
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qr3a Page 27

DEC Free LED Detailed Participant Survey Results

How many of the sockets where you installed the free LEDs were empty?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	57 100.0	37 100.0	8 100.0	12 100.0	25 100.0	32 100.0	17 100.0	14 100.0	25 100.0	30 100.0	9 100.0	4 100.0	22 100.0	17 100.0	15 100.0	34 100.0	23 100.0	34 100.0	14 100.0	7 100.0
1	14 24.6	11 29.7	-	3 25.0	5 20.0	9 28.1	4 23.5	5 35.7	5 20.0	11 36.7 K	1 11.1	2 50.0	6 27.3	3 17.6	5 33.3	5 14.7	9 39.1 P	8 23.5	3 21.4	3 42.9
2	19 33.3	12 32.4	2 25.0	5 41.7	8 32.0	11 34.4	6 35.3	4 28.6	8 32.0	9 30.0	3 33.3	1 25.0	7 31.8	6 35.3	4 26.7	11 32.4	8 34.8	11 32.4	4 28.6	2 28.6
3	11 19.3	7 18.9	3 37.5	1 8.3	6 24.0	5 15.6	2 11.8	2 14.3	7 28.0	5 16.7	1 11.1	1 25.0	5 22.7	3 17.6	3 20.0	9 26.5 Q	2 8.7	7 20.6	4 28.6	-
4	6 10.5	1 2.7	2 25.0	3 25.0 B	-	6 18.8	-	2 14.3	4 16.0	2 6.7	1 11.1	-	2 9.1	3 17.6	1 6.7	5 14.7	1 4.3	4 11.8	2 14.3	-
6	3 5.3	2 5.4	1 12.5	-	2 8.0	1 3.1	2 11.8	1 7.1	-	3 10.0	-	-	2 9.1	-	1 6.7	3 8.8	-	3 8.8	-	-
10	2 3.5	2 5.4	-	-	2 8.0	-	1 5.9	-	1 4.0	-	2 22.2	-	-	1 5.9	-	-	2 8.7	-	1 7.1	1 14.3
11	1 1.8	1 2.7	-	-	1 4.0	-	1 5.9	-	-	-	1 11.1	-	-	-	1 6.7	-	1 4.3	-	-	1 14.3
Don't know/Not sure	1 1.8	1 2.7	-	-	1 4.0	-	1 5.9	-	-	-	-	-	-	1 5.9	-	1 2.9	-	1 2.9	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	2.82	2.86	3.38 D	2.33	3.42	2.38	3.44	2.36	2.72	2.33	5.00 JL	1.75	2.50	2.88	2.87	2.79	2.87	2.58	2.93	4.00

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qr4 Page 28

DEC Free LED Detailed Participant Survey Results

At the time that you installed the free LED(s), were any of the bulbs you replaced with free LEDs still working or had all of them burnt out?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	460 100.0	344 100.0	28 100.0	85 100.0	276 100.0	181 100.0	115 100.0	162 100.0	175 100.0	290 100.0	85 100.0	33 100.0	125 100.0	155 100.0	162 100.0	233 100.0	220 100.0	192 100.0	153 100.0	86 100.0
All were still working	205 44.6	154 44.8	16 57.1	35 41.2	130 47.1	75 41.4	50 43.5	76 46.9	75 42.9	125 43.1	43 50.6	17 51.5	49 39.2	66 42.6	83 51.2 M	111 47.6	91 41.4	85 44.3	67 43.8	38 44.2
Some were still working	139 30.2	103 29.9	5 17.9	29 34.1 C	77 27.9	59 32.6	29 25.2	49 30.2	58 33.1	86 29.7	28 32.9 L	6 18.2	45 36.0 O	49 31.6	39 24.1	73 31.3	63 28.6	57 29.7	52 34.0	23 26.7
All of them had burnt out	116 25.2	87 25.3	7 25.0	21 24.7	69 25.0	47 26.0	36 31.3	37 22.8	42 24.0	79 27.2 K	14 16.5	10 30.3	31 24.8	40 25.8	40 24.7	49 21.0	66 30.0 P	50 26.0	34 22.2	25 29.1
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr1 Page 29

DEC Free LED Detailed Participant Survey Results

When you purchase light bulbs, do you generally purchase the lowest priced bulb, or do you consider other factors, such as energy efficiency, quality of light, or longevity of the bulb a factor in your decision?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
I purchase the lowest-priced bulb	118 24.5	80 22.0	8 28.6	28 32.2 B	51 17.5	66 35.3 E	24 20.3	42 24.1	50 27.6	78 25.7 KL	12 13.6	2 5.7	39 29.5	38 23.6	39 23.1	72 30.1 Q	44 18.6	69 34.7 ST	31 19.1	13 14.6
I consider other factors	362 75.1	282 77.5 D	20 71.4	59 67.8	239 81.8 F	121 64.7	94 79.7	130 74.7	131 72.4	224 73.7	76 86.4 J	33 94.3 J	93 70.5	123 76.4	128 75.7	165 69.0	192 81.4 P	130 65.3	131 80.9 R	75 84.3 R
Don't know/Not sure	2 0.4	2 0.5	-	-	2 0.7	-	-	2 1.1	-	2 0.7	-	-	-	-	2 1.2	2 0.8	-	-	-	1 1.1
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr2 Page 30

DEC Free LED Detailed Participant Survey Results

If you had not received the <RECEIVED QUANTITY> LEDs from Duke Energy, what would you have purchased the next time you needed to buy light bulbs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Incandescent or halogen light bulbs	50 10.4	39 10.7	4 14.3	7 8.0	33 11.3	17 9.1	21 17.8 HI	15 8.6	13 7.2	32 10.5 L	9 10.2 L	1 2.9	8 6.1	16 9.9	24 14.2 M	26 10.9	23 9.7	29 14.6 ST	11 6.8	6 6.7
CFLs	47 9.8	36 9.9	4 14.3	7 8.0	31 10.6	16 8.6	10 8.5	18 10.3	18 9.9	27 8.9	12 13.6	3 8.6	16 12.1	16 9.9	12 7.1	22 9.2	23 9.7	15 7.5	20 12.3	8 9.0
LEDs	163 33.8	129 35.4 C	6 21.4	26 29.9	118 40.4 F	43 23.0	40 33.9	60 34.5	60 33.1	99 32.6	37 42.0	14 40.0	31 23.5	56 34.8 M	68 40.2 M	72 30.1	89 37.7 P	53 26.6	61 37.7 R	34 38.2 R
A mix of bulbs	133 27.6	104 28.6	6 21.4	23 26.4	78 26.7	54 28.9	25 21.2	54 31.0 G	51 28.2	84 27.6	23 26.1	16 45.7 JK	41 31.1	43 26.7	43 25.4	58 24.3	73 30.9	46 23.1	47 29.0	32 36.0 R
The lowest cost bulbs	88 18.3	56 15.4	7 25.0	24 27.6 B	31 10.6	57 30.5 E	22 18.6	26 14.9	39 21.5	61 20.1 KL	7 8.0	1 2.9	36 27.3 NO	30 18.6	21 12.4	60 25.1 Q	28 11.9	56 28.1 ST	22 13.6	9 10.1
Don't know/Not sure	1 0.2	-	1 3.6	-	1 0.3	-	-	1 0.6	-	1 0.3	-	-	-	-	1 0.6	1 0.4	-	-	1 0.6	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr3 Page 31

DEC Free LED Detailed Participant Survey Results

Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would you have still purchased CFLs, or would you have purchased a different type of light bulb?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	47 100.0	36 100.0	4 100.0	7 100.0	31 100.0	16 100.0	10 100.0	18 100.0	18 100.0	27 100.0	12 100.0	3 100.0	16 100.0	16 100.0	12 100.0	22 100.0	23 100.0	15 100.0	20 100.0	8 100.0
Still would have purchased CFLs	47 100.0	36 100.0	4 100.0	7 100.0	31 100.0	16 100.0	10 100.0	18 100.0	18 100.0	27 100.0	12 100.0	3 100.0	16 100.0	16 100.0	12 100.0	22 100.0	23 100.0	15 100.0	20 100.0	8 100.0
Would have purchased a different type of light bulb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr4 Page 32

DEC Free LED Detailed Participant Survey Results

Would you have purchased all <RECEIVED QUANTITY> LEDs or just some at full retail price of \$<LEDBULBCOST> per bulb?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	163 100.0	129 100.0	6 100.0	26 100.0	118 100.0	43 100.0	40 100.0	60 100.0	60 100.0	99 100.0	37 100.0	14 100.0	31 100.0	56 100.0	68 100.0	72 100.0	89 100.0	53 100.0	61 100.0	34 100.0
All of them	69 42.3	55 42.6	3 50.0	9 34.6	54 45.8	14 32.6	18 45.0	23 38.3	25 41.7	43 43.4	15 40.5	5 35.7	10 32.3	25 44.6	28 41.2	32 44.4	35 39.3	25 47.2	22 36.1	13 38.2
Some of them	93 57.1	73 56.6	3 50.0	17 65.4	63 53.4	29 67.4 E	22 55.0	36 60.0	35 58.3	55 55.6	22 59.5	9 64.3	21 67.7	31 55.4	39 57.4	40 55.6	53 59.6	28 52.8	39 63.9	20 58.8
Don't know/Not sure	1 0.6	1 0.8	-	-	1 0.8	-	-	1 1.7	-	1 1.0	-	-	-	-	1 1.5	-	1 1.1	-	-	1 2.9
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr5 Page 33

DEC Free LED Detailed Participant Survey Results

How many of the <RECEIVED QUANTITY> LEDs would you have purchased at the full retail price of \$<LEDBULBCOST> per bulb?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	93 100.0	73 100.0	3 100.0	17 100.0	63 100.0	29 100.0	22 100.0	36 100.0	35 100.0	55 100.0	22 100.0	9 100.0	21 100.0	31 100.0	39 100.0	40 100.0	53 100.0	28 100.0	39 100.0	20 100.0
1	2 2.2	1 1.4	-	1 5.9	1 1.6	1 3.4	-	2 5.6	-	2 3.6	-	-	1 4.8	-	1 2.6	-	2 3.8	1 3.6	1 2.6	-
2	11 11.8	8 11.0	-	3 17.6	8 12.7	3 10.3	4 18.2 I	6 16.7 I	1 2.9	7 12.7	1 4.5	1 11.1	3 14.3	1 3.2	7 17.9 N	4 10.0	7 13.2	4 14.3	3 7.7	3 15.0
3	4 4.3	3 4.1	-	1 5.9	2 3.2	2 6.9	1 4.5	-	3 8.6	3 5.5	1 4.5	-	1 4.8	1 3.2	2 5.1	1 2.5	3 5.7	3 10.7	1 2.6	-
4	11 11.8	8 11.0	1 33.3	2 11.8	7 11.1	4 13.8	1 4.5	5 13.9	5 14.3	3 5.5	7 31.8 J	-	3 14.3	5 16.1	3 7.7	3 7.5	8 15.1	2 7.1	7 17.9 T	1 5.0
5	13 14.0	11 15.1	-	2 11.8	9 14.3	4 13.8	2 9.1	5 13.9	6 17.1	10 18.2 K	1 4.5	2 22.2	3 14.3	5 16.1	5 12.8	6 15.0	7 13.2	3 10.7	6 15.4	4 20.0
6	8 8.6	7 9.6	1 33.3	-	7 11.1	1 3.4	1 4.5	2 5.6	5 14.3	3 5.5	4 18.2	1 11.1	1 4.8	4 12.9	3 7.7	4 10.0	4 7.5	-	7 17.9 T	1 5.0
7	3 3.2	3 4.1	-	-	3 4.8	-	1 4.5	2 5.6	-	2 3.6	1 4.5	-	-	-	2 5.1	2 5.0	1 1.9	2 7.1	1 2.6	-
8	8 8.6	6 8.2	-	2 11.8	4 6.3	4 13.8	2 9.1	2 5.6	4 11.4	4 7.3	1 4.5	2 22.2	1 4.8	5 16.1 O	1 2.6	4 10.0	4 7.5	3 10.7	2 5.1	2 10.0
9	4 4.3	3 4.1	-	1 5.9	2 3.2	2 6.9	2 9.1	2 5.6	-	3 5.5	1 4.5	-	2 9.5	-	2 5.1	1 2.5	3 5.7	1 3.6	2 5.1	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qfr5 Page 34

(Continued)

DEC Free LED Detailed Participant Survey Results

How many of the <RECEIVED QUANTITY> LEDs would you have purchased at the full retail price of \$<LEDBULBCOST> per bulb?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
10	13 14.0	10 13.7	-	3 17.6	8 12.7	4 13.8	2 9.1	4 11.1	7 20.0	8 14.5	2 9.1	2 22.2	5 23.8	4 12.9	4 10.3	7 17.5	6 11.3	4 14.3	5 12.8	4 20.0
11	1 1.1	1 1.4	-	-	1 1.6	-	1 4.5	-	-	-	1 4.5	-	-	-	1 2.6	-	1 1.9	-	-	1 5.0
12	3 3.2	3 4.1	-	-	3 4.8	-	3 13.6	-	-	3 5.5	-	-	-	1 3.2	2 5.1	1 2.5	2 3.8	1 3.6	2 5.1	-
15	9 9.7	6 8.2	1 33.3	2 11.8	6 9.5	3 10.3	1 4.5	4 11.1	4 11.4	4 7.3	2 9.1	1 11.1	1 4.8	4 12.9	4 10.3	4 10.0	5 9.4	2 7.1	2 5.1	3 15.0
Don't know/Not sure	3 3.2	3 4.1	-	-	2 3.2	1 3.4	1 4.5	2 5.6	-	3 5.5	-	-	-	1 3.2	2 5.1	3 7.5	-	2 7.1	-	1 5.0
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	6.96	6.97	8.33	6.65	6.98	6.79	7.33	6.44	7.23	6.81	6.68	7.67	6.38	7.53	6.78	7.41	6.64	6.54	6.54	7.79

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr6 Page 35

DEC Free LED Detailed Participant Survey Results

Just to make sure I recorded everything accurately, you are telling me that of the <RECEIVED QUANTITY> LEDs that you received from Duke Energy, you would have purchased <FR5 ANSWER> LEDs, which means that you would not have purchased <RECEIVED QUANTITY-FR5 ANSWER>. Is that correct?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	78 100.0	61 100.0	2 100.0	15 100.0	52 100.0	25 100.0	17 100.0	30 100.0	31 100.0	45 100.0	20 100.0	8 100.0	20 100.0	25 100.0	31 100.0	32 100.0	46 100.0	23 100.0	35 100.0	16 100.0
Yes	78 100.0	61 100.0	2 100.0	15 100.0	52 100.0	25 100.0	17 100.0	30 100.0	31 100.0	45 100.0	20 100.0	8 100.0	20 100.0	25 100.0	31 100.0	32 100.0	46 100.0	23 100.0	35 100.0	16 100.0
No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr7 Page 36

DEC Free LED Detailed Participant Survey Results

For these <RECEIVED QUANTITY-FR5 ANSWER> bulbs, would you have still purchased LEDs but have done it later, or would you have purchased a different type of light bulb instead of LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	78 100.0	61 100.0	2 100.0	15 100.0	52 100.0	25 100.0	17 100.0	30 100.0	31 100.0	45 100.0	20 100.0	8 100.0	20 100.0	25 100.0	31 100.0	32 100.0	46 100.0	23 100.0	35 100.0	16 100.0
Purchased LEDs later	72 92.3	56 91.8	2 100.0 B	14 93.3	47 90.4	24 96.0	17 100.0 I	29 96.7 I	26 83.9	41 91.1	18 90.0	8 100.0 J	19 95.0	21 84.0	30 96.8	30 93.8	42 91.3	23 100.0 S	30 85.7	15 93.8
Purchased a different type of light bulb	6 7.7	5 8.2	-	1 6.7	5 9.6	1 4.0	-	1 3.3	5 16.1 H	4 8.9	2 10.0	-	1 5.0	4 16.0	1 3.2	2 6.2	4 8.7	-	5 14.3	1 6.2
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr7a Page 37

DEC Free LED Detailed Participant Survey Results

What type(s) of light bulbs would you have purchased instead of LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	6 100.0	5 100.0	-	1 100.0	5 100.0	1 100.0	-	1 100.0	5 100.0	4 100.0	2 100.0	-	1 100.0	4 100.0	1 100.0	2 100.0	4 100.0	-	5 100.0	1 100.0
Incandescent or halogen bulbs	2 33.3	2 40.0	-	-	2 40.0	-	-	-	2 40.0	-	2 100.0	-	-	2 50.0	-	-	2 50.0	-	2 40.0	-
CFLs	2 33.3	2 40.0	-	-	2 40.0	-	-	1 100.0	1 20.0	2 50.0	-	-	-	1 25.0	1 100.0	1 50.0	1 25.0	-	1 20.0	1 100.0
Other	2 33.3	1 20.0	-	1 100.0	1 20.0	1 100.0	-	-	2 40.0	2 50.0	-	-	1 100.0	1 25.0	-	1 50.0	1 25.0	-	2 40.0	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr7b Page 38

DEC Free LED Detailed Participant Survey Results

Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would CFLs still have been a part of the mix?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age		Education		Income			
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)
Total	2 100.0	2 100.0	-	-	2 100.0	-	-	1 100.0	1 100.0	2 100.0	-	-	-	1 100.0	1 100.0	1 100.0	1 100.0	-	1 100.0	1 100.0
Yes	2 100.0	2 100.0	-	-	2 100.0	-	-	1 100.0	1 100.0	2 100.0	-	-	-	1 100.0	1 100.0	1 100.0	1 100.0	-	1 100.0	1 100.0
No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr8 Page 39

DEC Free LED Detailed Participant Survey Results

What types of bulbs would likely have been in the mix?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	133 100.0	104 100.0	6 100.0	23 100.0	78 100.0	54 100.0	25 100.0	54 100.0	51 100.0	84 100.0	23 100.0	16 100.0	41 100.0	43 100.0	43 100.0	58 100.0	73 100.0	46 100.0	47 100.0	32 100.0
Incandescent or halogen bulbs	90 67.7	72 69.2	3 50.0	15 65.2	55 70.5	35 64.8	18 72.0	37 68.5	33 64.7	57 67.9	19 82.6 L	9 56.2	31 75.6 N	25 58.1	31 72.1	35 60.3	54 74.0 P	29 63.0	31 66.0	25 78.1
CFLs	68 51.1	58 55.8 D	2 33.3	8 34.8	42 53.8	25 46.3	13 52.0	29 53.7	25 49.0	45 53.6 K	7 30.4	11 68.8 K	21 51.2	22 51.2	21 48.8	31 53.4	36 49.3	25 54.3	25 53.2	15 46.9
LEDs	88 66.2	70 67.3	4 66.7	14 60.9	51 65.4	36 66.7	16 64.0	30 55.6	40 78.4 H	54 64.3	17 73.9	11 68.8	29 70.7 O	32 74.4 O	21 48.8	35 60.3	51 69.9	28 60.9	31 66.0	25 78.1 R
Other, specify	2 1.5	2 1.9	-	-	-	2 3.7	-	1 1.9	1 2.0	1 1.2	-	-	1 2.4	1 2.3	-	2 3.4	-	1 2.2	-	1 3.1
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr9 Page 40

DEC Free LED Detailed Participant Survey Results

Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would CFLs still have been a part of the mix?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	68 100.0	58 100.0	2 100.0	8 100.0	42 100.0	25 100.0	13 100.0	29 100.0	25 100.0	45 100.0	7 100.0	11 100.0	21 100.0	22 100.0	21 100.0	31 100.0	36 100.0	25 100.0	25 100.0	15 100.0
Yes	68 100.0	58 100.0	2 100.0	8 100.0	42 100.0	25 100.0	13 100.0	29 100.0	25 100.0	45 100.0	7 100.0	11 100.0	21 100.0	22 100.0	21 100.0	31 100.0	36 100.0	25 100.0	25 100.0	15 100.0
No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qfr10 Page 41

DEC Free LED Detailed Participant Survey Results

Earlier, you indicated that you replaced working light bulbs with the LEDs you received for free from Duke Energy. If you had not received the free LEDs from Duke Energy, would you have still replaced these working light bulbs with LEDs, or would you have waited until they burnt out?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	242 100.0	183 100.0	15 100.0	43 100.0	160 100.0	79 100.0	51 100.0	93 100.0	92 100.0	143 100.0	58 100.0	21 100.0	61 100.0	78 100.0	92 100.0	121 100.0	116 100.0	79 100.0	94 100.0	50 100.0
Would have replaced working bulbs with LEDs	66 27.3	47 25.7	3 20.0	15 34.9	45 28.1	19 24.1	15 29.4	25 26.9	24 26.1	39 27.3	18 31.0	4 19.0	12 19.7	21 26.9	28 30.4	30 24.8	35 30.2	19 24.1	25 26.6	15 30.0
Would have waited until working bulbs burned out	176 72.7	136 74.3	12 80.0	28 65.1	115 71.9	60 75.9	36 70.6	68 73.1	68 73.9	104 72.7	40 69.0	17 81.0	49 80.3	57 73.1	64 69.6	91 75.2	81 69.8	60 75.9	69 73.4	35 70.0
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qs01 Page 42

DEC Free LED Detailed Participant Survey Results

Besides the free LEDs you received from Duke Energy, have you or anyone in your household purchased light bulbs in the past year?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yes	253	201	13	38	170	82	48	102	100	149	61	22	61	92	91	124	125	90	84	62
	52.5	55.2	46.4	43.7	58.2	43.9	40.7	58.6	55.2	49.0	69.3	62.9	46.2	57.1	53.8	51.9	53.0	45.2	51.9	69.7
		D			F			G	G		J			M						RS
No	229	163	15	49	122	105	70	72	81	155	27	13	71	69	78	115	111	109	78	27
	47.5	44.8	53.6	56.3	41.8	56.1	59.3	41.4	44.8	51.0	30.7	37.1	53.8	42.9	46.2	48.1	47.0	54.8	48.1	30.3
				B		E	HI			K			N					T	T	
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qso2 Page 43

DEC Free LED Detailed Participant Survey Results

Did you purchase these light bulbs before or after you received the free LEDs from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	253 100.0	201 100.0	13 100.0	38 100.0	170 100.0	82 100.0	48 100.0	102 100.0	100 100.0	149 100.0	61 100.0	22 100.0	61 100.0	92 100.0	91 100.0	124 100.0	125 100.0	90 100.0	84 100.0	62 100.0
Before receiving LEDs from Duke Energy	162 64.0	128 63.7	7 53.8	27 71.1	104 61.2	57 69.5	35 72.9 H	58 56.9	66 66.0	103 69.1 L	36 59.0	10 45.5	32 52.5	63 68.5 M	61 67.0 M	83 66.9	76 60.8	63 70.0 T	55 65.5 T	31 50.0
After receiving LEDs from Duke Energy	43 17.0	36 17.9 D	4 30.8 D	3 7.9	33 19.4	10 12.2	6 12.5	19 18.6	18 18.0	25 16.8	10 16.4	6 27.3	14 23.0	13 14.1	15 16.5	16 12.9	26 20.8 P	13 14.4	16 19.0	11 17.7
Both before and after receiving the free LEDs from Duke Energy	47 18.6	36 17.9	2 15.4	8 21.1	32 18.8	15 18.3	7 14.6	24 23.5	16 16.0	20 13.4	15 24.6 J	6 27.3	15 24.6	16 17.4	14 15.4	25 20.2	22 17.6	14 15.6	13 15.5	19 30.6 RS
Don't know/Not sure	1 0.4	1 0.5	-	-	1 0.6	-	-	1 1.0	-	1 0.7	-	-	-	-	1 1.1	-	1 0.8	-	-	1 1.6
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qso3 Page 44

DEC Free LED Detailed Participant Survey Results

What types of light bulbs did you purchase in the past year?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	254 100.0	202 100.0	13 100.0	38 100.0	170 100.0	83 100.0	48 100.0	102 100.0	101 100.0	149 100.0	62 100.0	22 100.0	61 100.0	93 100.0	91 100.0	125 100.0	125 100.0	90 100.0	85 100.0	62 100.0
Incandescent or halogen bulbs	117 46.1	93 46.0	5 38.5	18 47.4	74 43.5	43 51.8	19 39.6	51 50.0	46 45.5	67 45.0	26 41.9	10 45.5	30 49.2	41 44.1	42 46.2	57 45.6	58 46.4	41 45.6	37 43.5	30 48.4
CFL bulb	84 33.1	65 32.2	5 38.5	14 36.8	55 32.4	28 33.7	13 27.1	36 35.3	33 32.7	53 35.6	16 25.8	9 40.9	14 23.0	40 43.0 MO	25 27.5	40 32.0	43 34.4	28 31.1	37 43.5 RT	14 22.6
LED bulb	119 46.9	98 48.5	5 38.5	16 42.1	90 52.9 F	28 33.7	20 41.7	46 45.1	51 50.5	63 42.3	36 58.1 J	15 68.2 J	28 45.9	42 45.2	42 46.2	49 39.2	68 54.4 P	32 35.6	37 43.5	40 64.5 RS
Other, specify	16 6.3	13 6.4	2 15.4	1 2.6	11 6.5	5 6.0	6 12.5 I	6 5.9	4 4.0	10 6.7	4 6.5	-	4 6.6	5 5.4	7 7.7	10 8.0	6 4.8	10 11.1 T	4 4.7	1 1.6
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qso4 Page 45

DEC Free LED Detailed Participant Survey Results

Approximately how many CFLs or LEDs did you purchase after you received the free LEDs from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	63	51	3	9	47	16	7	31	25	29	20	11	17	23	20	26	36	14	21	25
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	1	1	-	-	1	-	1	-	-	1	-	-	-	1	-	-	1	1	-	-
	1.6	2.0			2.1		14.3			3.4				4.3			2.8	7.1		
2	8	4	-	4	3	5	1	4	3	5	1	1	4	2	1	3	5	3	3	2
	12.7	7.8		44.4 B	6.4	31.2 E	14.3	12.9	12.0	17.2	5.0	9.1	23.5	8.7	5.0	11.5	13.9	21.4	14.3	8.0
3	6	5	-	1	4	2	1	1	4	4	2	-	2	1	3	1	5	1	3	2
	9.5	9.8		11.1	8.5	12.5	14.3	3.2	16.0	13.8	10.0		11.8	4.3	15.0	3.8	13.9	7.1	14.3	8.0
4	10	8	1	1	8	2	1	4	5	4	5	1	1	6	3	4	6	2	2	5
	15.9	15.7	33.3	11.1	17.0	12.5	14.3	12.9	20.0	13.8	25.0	9.1	5.9	26.1 M	15.0	15.4	16.7	14.3	9.5	20.0
5	3	2	-	1	2	1	-	2	1	1	1	1	-	1	2	2	1	1	1	1
	4.8	3.9		11.1	4.3	6.2		6.5	4.0	3.4	5.0	9.1		4.3	10.0	7.7	2.8	7.1	4.8	4.0
6	12	11	1	-	11	1	1	11	-	5	4	2	5	1	4	6	5	4	5	1
	19.0	21.6	33.3		23.4 F	6.2	14.3	35.5		17.2	20.0	18.2	29.4 N	4.3	20.0	23.1	13.9	28.6 T	23.8 T	4.0
7	1	1	-	-	1	-	-	1	-	-	-	1	-	-	1	-	1	-	-	1
	1.6	2.0			2.1			3.2				9.1			5.0		2.8			4.0
8	6	4	-	2	2	4	2	3	1	4	1	-	1	4	1	4	2	1	3	2
	9.5	7.8		22.2	4.3	25.0 E	28.6	9.7	4.0	13.8	5.0		5.9	17.4	5.0	15.4	5.6	7.1	14.3	8.0
9	1	1	-	-	1	-	-	-	1	1	-	-	-	1	-	1	-	1	-	-
	1.6	2.0			2.1				4.0	3.4				4.3		3.8		7.1		

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qso4 Page 46

(Continued)

DEC Free LED Detailed Participant Survey Results

Approximately how many CFLs or LEDs did you purchase after you received the free LEDs from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
10	6 9.5	6 11.8	-	-	5 10.6	1 6.2	-	3 9.7	3 12.0	2 6.9	1 5.0	3 27.3	1 5.9	5 21.7	-	1 3.8	5 13.9	-	2 9.5	4 16.0
12	3 4.8	2 3.9	1 33.3	-	3 6.4	-	-	1 3.2	2 8.0	2 6.9	1 5.0	-	2 11.8	-	1 5.0	2 7.7	1 2.8	-	2 9.5	1 4.0
20	1 1.6	1 2.0	-	-	1 2.1	-	-	1 3.2	-	-	1 5.0	-	-	-	1 5.0	1 3.8	-	-	-	1 4.0
25	1 1.6	1 2.0	-	-	1 2.1	-	-	-	1 4.0	-	1 5.0	-	-	-	1 5.0	-	1 2.8	-	-	1 4.0
30	1 1.6	1 2.0	-	-	1 2.1	-	-	-	1 4.0	-	1 5.0	-	-	-	1 5.0	-	1 2.8	-	-	1 4.0
32	1 1.6	1 2.0	-	-	1 2.1	-	-	-	1 4.0	-	1 5.0	-	-	1 4.3	-	1 3.8	-	-	-	1 4.0
40	1 1.6	1 2.0	-	-	1 2.1	-	-	-	1 4.0	-	-	1 9.1	1 5.9	-	-	-	1 2.8	-	-	1 4.0
50	1 1.6	1 2.0	-	-	1 2.1	-	-	-	1 4.0	-	-	1 9.1	-	-	1 5.0	-	1 2.8	-	-	1 4.0
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	8.24	9.04 D	7.33	4.00	9.40 F	4.81	4.57	6.32	11.64 GH	5.48	9.70 J	13.64	7.65	7.22	10.45	7.62	8.75	4.57	6.00	12.52 RS

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST

T-Test for Means, Z-Test for Percentages

Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qso5 Page 47

DEC Free LED Detailed Participant Survey Results

Did your experience with the free LEDs you received from Duke Energy encourage you IN ANY WAY to purchase the additional CFLs or LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	63 100.0	51 100.0	3 100.0	9 100.0	47 100.0	16 100.0	7 100.0	31 100.0	25 100.0	29 100.0	20 100.0	11 100.0	17 100.0	23 100.0	20 100.0	26 100.0	36 100.0	14 100.0	21 100.0	25 100.0
Yes	51 81.0	40 78.4	3 100.0 B	8 88.9	37 78.7	14 87.5	6 85.7	25 80.6	20 80.0	24 82.8	15 75.0	9 81.8	15 88.2	18 78.3	15 75.0	21 80.8	29 80.6	13 92.9	17 81.0	19 76.0
No	12 19.0	11 21.6	-	1 11.1	10 21.3	2 12.5	1 14.3	6 19.4	5 20.0	5 17.2	5 25.0	2 18.2	2 11.8	5 21.7	5 25.0	5 19.2	7 19.4	1 7.1	4 19.0	6 24.0
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qso6 Page 48

DEC Free LED Detailed Participant Survey Results

How influential was your experience with the free LEDs you received from Duke Energy on your decision to purchase the additional CFLs or LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	51 100.0	40 100.0	3 100.0	8 100.0	37 100.0	14 100.0	6 100.0	25 100.0	20 100.0	24 100.0	15 100.0	9 100.0	15 100.0	18 100.0	15 100.0	21 100.0	29 100.0	13 100.0	17 100.0	19 100.0
Net 0-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0 - Not at all influential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net 5-6	5 9.8	4 10.0	-	1 12.5	4 10.8	1 7.1	-	4 16.0	1 5.0	1 4.2	2 13.3	2 22.2	2 13.3	1 5.6	2 13.3	2 9.5	3 10.3	2 15.4	1 5.9	2 10.5
5	1 2.0	1 2.5	-	-	1 2.7	-	-	-	1 5.0	-	-	1 11.1	-	1 5.6	-	1 4.8	-	-	-	1 5.3
6	4 7.8	3 7.5	-	1 12.5	3 8.1	1 7.1	-	4 16.0	-	1 4.2	2 13.3	1 11.1	2 13.3	-	2 13.3	1 4.8	3 10.3	2 15.4	1 5.9	1 5.3
Net 7-10	46 90.2	36 90.0	3 100.0	7 87.5	33 89.2	13 92.9	6 100.0	21 84.0	19 95.0	23 95.8	13 86.7	7 77.8	13 86.7	17 94.4	13 86.7	19 90.5	26 89.7	11 84.6	16 94.1	17 89.5

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qso6 Page 49

(Continued)

DEC Free LED Detailed Participant Survey Results

How influential was your experience with the free LEDs you received from Duke Energy on your decision to purchase the additional CFLs or LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
7	9 17.6	7 17.5	-	2 25.0	6 16.2	3 21.4	1 16.7	6 24.0	2 10.0	4 16.7	1 6.7	3 33.3	2 13.3	5 27.8	-	3 14.3	6 20.7	1 7.7	3 17.6	5 26.3
8	11 21.6	9 22.5	1 33.3	1 12.5	9 24.3	2 14.3	1 16.7	5 20.0	5 25.0	4 16.7	6 40.0 L	1 11.1	4 26.7	2 11.1	5 33.3	4 19.0	7 24.1	2 15.4	4 23.5	5 26.3
9	2 3.9	2 5.0	-	-	2 5.4	-	-	1 4.0	1 5.0	-	1 6.7	1 11.1	2 13.3	-	-	-	2 6.9	-	1 5.9	1 5.3
10 - Very influential	24 47.1	18 45.0	2 66.7	4 50.0	16 43.2	8 57.1	4 66.7	9 36.0	11 55.0	15 62.5 KL	5 33.3	2 22.2	5 33.3	10 55.6	8 53.3	12 57.1	11 37.9	8 61.5 T	8 47.1	6 31.6
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	8.59	8.55	9.33	8.50	8.51	8.79	9.17	8.20	8.90	9.00 L	8.40	7.67	8.40	8.67	8.80	8.76	8.41	8.85	8.71	8.16

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qmil Page 50

DEC Free LED Detailed Participant Survey Results

How did you first learn you could receive free LEDs from Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Duke Energy mailing or letter	136 28.2	101 27.7	9 32.1	24 27.6	89 30.5	46 24.6	33 28.0	51 29.3	49 27.1	84 27.6	23 26.1	9 25.7	28 21.2	44 27.3	57 33.7 M	67 28.0	64 27.1	57 28.6	43 26.5	19 21.3
Bill insert	72 14.9	51 14.0	5 17.9	16 18.4	47 16.1	25 13.4	17 14.4	30 17.2	24 13.3	46 15.1	13 14.8	8 22.9	11 8.3	20 12.4	38 22.5 MN	45 18.8 Q	27 11.4	33 16.6	22 13.6	13 14.6
Duke Energy website	182 37.8	138 37.9	11 39.3	32 36.8	102 34.9	78 41.7	51 43.2 H	56 32.2	72 39.8	120 39.5	33 37.5	12 34.3	59 44.7 O	66 41.0 O	51 30.2	95 39.7	85 36.0	73 36.7	69 42.6	33 37.1
Family, friends, word of mouth	34 7.1	27 7.4	-	7 8.0	20 6.8	14 7.5	6 5.1	14 8.0	14 7.7	19 6.2	7 8.0	3 8.6	16 12.1 NO	10 6.2	8 4.7	10 4.2	24 10.2 P	16 8.0	13 8.0	4 4.5
Direct email about the program	51 10.6	40 11.0	3 10.7	8 9.2	29 9.9	22 11.8	10 8.5	22 12.6	17 9.4	30 9.9	11 12.5	3 8.6	14 10.6	21 13.0 O	12 7.1	19 7.9	32 13.6 P	16 8.0	14 8.6	18 20.2 RS
Or some other way? (please specify)	7 1.5	7 1.9	-	-	5 1.7	2 1.1	1 0.8	1 0.6	5 2.8	5 1.6	1 1.1	-	4 3.0	-	3 1.8	3 1.3	4 1.7	4 2.0	1 0.6	2 2.2
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmi2 Page 51

DEC Free LED Detailed Participant Survey Results

Have you ever logged into your online residential account with Duke Energy?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Yes	399 82.8	299 82.1	24 85.7	74 85.1	240 82.2	157 84.0	92 78.0	145 83.3	154 85.1	252 82.9	77 87.5	30 85.7	125 94.7 NO	132 82.0 O	124 73.4	188 78.7	206 87.3 P	155 77.9	142 87.7 R	79 88.8 R
No	59 12.2	44 12.1	4 14.3	10 11.5	37 12.7	22 11.8	19 16.1 I	26 14.9 I	14 7.7	38 12.5	7 8.0	3 8.6	2 1.5	18 11.2 M	38 22.5 MN	38 15.9 Q	20 8.5	34 17.1 ST	13 8.0	5 5.6
Don't know/Not sure	24 5.0	21 5.8	-	3 3.4	15 5.1	8 4.3	7 5.9 H	3 1.7	13 7.2 H	14 4.6	4 4.5	2 5.7	5 3.8	11 6.8	7 4.1	13 5.4	10 4.2	10 5.0	7 4.3	5 5.6
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmi3 Page 52

DEC Free LED Detailed Participant Survey Results

Have you ever received a notification that free LEDs were available while you were logged into your online account?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	399 100.0	299 100.0	24 100.0	74 100.0	240 100.0	157 100.0	92 100.0	145 100.0	154 100.0	252 100.0	77 100.0	30 100.0	125 100.0	132 100.0	124 100.0	188 100.0	206 100.0	155 100.0	142 100.0	79 100.0
Yes	282 70.7	203 67.9	19 79.2	59 79.7 B	157 65.4	123 78.3 E	64 69.6	103 71.0	111 72.1	187 74.2	52 67.5	18 60.0	98 78.4 O	100 75.8 O	72 58.1	133 70.7	147 71.4	107 69.0	107 75.4	55 69.6
No	37 9.3	31 10.4	2 8.3	4 5.4	26 10.8	11 7.0	9 9.8	15 10.3	13 8.4	21 8.3	8 10.4	4 13.3	12 9.6	7 5.3	18 14.5 N	22 11.7	15 7.3	16 10.3	11 7.7	9 11.4
Don't know/Not sure	80 20.1	65 21.7	3 12.5	11 14.9	57 23.8 F	23 14.6	19 20.7	27 18.6	30 19.5	44 17.5	17 22.1	8 26.7	15 12.0	25 18.9	34 27.4 M	33 17.6	44 21.4	32 20.6	24 16.9	15 19.0
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmi4 Page 53

DEC Free LED Detailed Participant Survey Results

Did you request free LEDs as a result of this notification?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	282 100.0	203 100.0	19 100.0	59 100.0	157 100.0	123 100.0	64 100.0	103 100.0	111 100.0	187 100.0	52 100.0	18 100.0	98 100.0	100 100.0	72 100.0	133 100.0	147 100.0	107 100.0	107 100.0	55 100.0
Yes	249 88.3	178 87.7	18 94.7	52 88.1	137 87.3	111 90.2	57 89.1	91 88.3	98 88.3	167 89.3	47 90.4	16 88.9	88 89.8	85 85.0	65 90.3	119 89.5	128 87.1	91 85.0	96 89.7	50 90.9
No	17 6.0	13 6.4	-	4 6.8	10 6.4	7 5.7	4 6.2	7 6.8	6 5.4	9 4.8	3 5.8	1 5.6	6 6.1	9 9.0 0	2 2.8	9 6.8	8 5.4	8 7.5	7 6.5	2 3.6
Don't know/Not sure	16 5.7	12 5.9	1 5.3	3 5.1	10 6.4	5 4.1	3 4.7	5 4.9	7 6.3	11 5.9	2 3.8	1 5.6	4 4.1	6 6.0	5 6.9	5 3.8	11 7.5	8 7.5	4 3.7	3 5.5
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmi5 Page 54

DEC Free LED Detailed Participant Survey Results

Before ordering your LEDs, did you receive any materials from Duke Energy about the cost savings on your energy bill from installing more energy efficient lighting?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Yes	287 59.5	216 59.3	18 64.3	51 58.6	179 61.3	106 56.7	71 60.2	104 59.8	107 59.1	182 59.9	50 56.8	23 65.7	78 59.1	92 57.1	104 61.5	142 59.4	140 59.3	121 60.8	94 58.0	51 57.3
No	68 14.1	44 12.1	5 17.9	18 20.7 B	31 10.6	37 19.8 E	17 14.4	27 15.5	24 13.3	47 15.5 L	12 13.6 L	1 2.9	29 22.0 NO	20 12.4	18 10.7	38 15.9	29 12.3	36 18.1 T	22 13.6	7 7.9
Don't know/Not sure	127 26.3	104 28.6	5 17.9	18 20.7	82 28.1	44 23.5	30 25.4	43 24.7	50 27.6	75 24.7	26 29.5	11 31.4	25 18.9	49 30.4 M	47 27.8 M	59 24.7	67 28.4	42 21.1	46 28.4	31 34.8 R
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmi6 Page 55

DEC Free LED Detailed Participant Survey Results

Did you request the free LEDs from Duke Energy as a result of what you learned from these materials?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	287 100.0	216 100.0	18 100.0	51 100.0	179 100.0	106 100.0	71 100.0	104 100.0	107 100.0	182 100.0	50 100.0	23 100.0	78 100.0	92 100.0	104 100.0	142 100.0	140 100.0	121 100.0	94 100.0	51 100.0
Yes	195 67.9	140 64.8	13 72.2	40 78.4 B	112 62.6	81 76.4 E	44 62.0	70 67.3	76 71.0	134 73.6 K	28 56.0	14 60.9	49 62.8	64 69.6	73 70.2	109 76.8 Q	83 59.3	94 77.7 ST	59 62.8	27 52.9
No	65 22.6	53 24.5	3 16.7	9 17.6	46 25.7	19 17.9	21 29.6 I	25 24.0	19 17.8	33 18.1	16 32.0 J	7 30.4	21 26.9	22 23.9	19 18.3	24 16.9	39 27.9 P	20 16.5	25 26.6 R	18 35.3 R
Don't know/Not sure	27 9.4	23 10.6 D	2 11.1	2 3.9	21 11.7 F	6 5.7	6 8.5	9 8.7	12 11.2	15 8.2	6 12.0	2 8.7	8 10.3	6 6.5	12 11.5	9 6.3	18 12.9 P	7 5.8	10 10.6	6 11.8
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmi7 Page 56

DEC Free LED Detailed Participant Survey Results

Besides providing you free LEDs to use in your home, are you aware of any offerings from Duke Energy that can help you save energy in your home?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Yes	237 49.2	182 50.0	15 53.6	37 42.5	156 53.4 F	79 42.2	56 47.5	86 49.4	88 48.6	143 47.0	45 51.1	24 68.6 JK	55 41.7	76 47.2	92 54.4 M	104 43.5	128 54.2 P	84 42.2	88 54.3 R	46 51.7
No	213 44.2	158 43.4	12 42.9	43 49.4	120 41.1	93 49.7 E	55 46.6	75 43.1	82 45.3	139 45.7 L	36 40.9 L	9 25.7	65 49.2 O	78 48.4 O	65 38.5	115 48.1	96 40.7	100 50.3 S	63 38.9	37 41.6
Don't know/Not sure	32 6.6	24 6.6	1 3.6	7 8.0	16 5.5	15 8.0	7 5.9	13 7.5	11 6.1	22 7.2	7 8.0	2 5.7	12 9.1	7 4.3	12 7.1	20 8.4	12 5.1	15 7.5	11 6.8	6 6.7
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmi8 Page 57

DEC Free LED Detailed Participant Survey Results

What offerings were you aware of?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	237 100.0	182 100.0	15 100.0	37 100.0	156 100.0	79 100.0	56 100.0	86 100.0	88 100.0	143 100.0	45 100.0	24 100.0	55 100.0	76 100.0	92 100.0	104 100.0	128 100.0	84 100.0	88 100.0	46 100.0
Duke Energy online CFL/LED store	116 48.9	95 52.2 C	4 26.7	16 43.2	83 53.2 F	32 40.5	30 53.6	41 47.7	42 47.7	70 49.0	23 51.1	15 62.5	28 50.9	36 47.4	44 47.8	48 46.2	66 51.6	29 34.5	55 62.5 R	23 50.0 R
Home energy call/home energy assessment	124 52.3	100 54.9	6 40.0	18 48.6	90 57.7 F	34 43.0	35 62.5	44 51.2	43 48.9	78 54.5	27 60.0	16 66.7	25 45.5	36 47.4	57 62.0 MN	50 48.1	73 57.0	35 41.7	54 61.4 R	27 58.7 R
Power manager program	64 27.0	44 24.2	4 26.7	15 40.5 B	43 27.6	21 26.6	20 35.7 I	27 31.4 I	17 19.3	37 25.9	12 26.7	8 33.3	15 27.3	16 21.1	31 33.7 N	27 26.0	37 28.9	20 23.8	29 33.0	14 30.4
Appliance recycling program	80 33.8	57 31.3	7 46.7	16 43.2	53 34.0	27 34.2	26 46.4 I	29 33.7	23 26.1	52 36.4 L	17 37.8	5 20.8	14 25.5	25 32.9	39 42.4 M	37 35.6	42 32.8	26 31.0	36 40.9 T	12 26.1
Online home energy report	138 58.2	110 60.4 C	5 33.3	22 59.5 C	94 60.3	43 54.4	30 53.6	54 62.8	48 54.5	90 62.9	24 53.3	12 50.0	36 65.5 O	45 59.2	47 51.1	57 54.8	77 60.2	41 48.8	57 64.8 R	26 56.5
Other, specify	13 5.5	10 5.5	2 13.3	-	9 5.8	4 5.1	3 5.4	3 3.5	7 8.0	6 4.2	1 2.2	3 12.5	1 1.8	5 6.6	7 7.6 M	7 6.7	6 4.7	7 8.3	3 3.4	3 6.5
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qm110 Page 58

DEC Free LED Detailed Participant Survey Results

When did you find out about these offerings?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	237 100.0	182 100.0	15 100.0	37 100.0	156 100.0	79 100.0	56 100.0	86 100.0	88 100.0	143 100.0	45 100.0	24 100.0	55 100.0	76 100.0	92 100.0	104 100.0	128 100.0	84 100.0	88 100.0	46 100.0
Before ordering free LEDs	134 56.5	106 58.2	7 46.7	18 48.6	94 60.3	39 49.4	34 60.7	46 53.5	52 59.1	75 52.4	33 73.3 J	13 54.2	25 45.5	46 60.5 M	56 60.9 M	63 60.6	68 53.1	46 54.8	50 56.8	27 58.7
After ordering free LEDs	51 21.5	36 19.8	7 46.7 BD	8 21.6	27 17.3	23 29.1 E	8 14.3	19 22.1	22 25.0	32 22.4	6 13.3	4 16.7	16 29.1	15 19.7	16 17.4	21 20.2	28 21.9	23 27.4	16 18.2	8 17.4
Found out about some programs before and some programs after ordering LEDs	50 21.1	39 21.4 C	1 6.7	10 27.0 C	34 21.8	16 20.3	14 25.0	19 22.1	14 15.9	34 23.8 K	6 13.3	7 29.2	13 23.6	15 19.7	19 20.7	20 19.2	30 23.4	14 16.7	22 25.0	10 21.7
Both before and after	1 0.4	-	-	1 2.7	-	1 1.3	-	1 1.2	-	1 0.7	-	-	1 1.8	-	-	-	1 0.8	1 1.2	-	-
Don't know/Not sure	1 0.4	1 0.5	-	-	1 0.6	-	-	1 1.2	-	1 0.7	-	-	-	-	1 1.1	-	1 0.8	-	-	1 2.2
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qm11 Page 59

DEC Free LED Detailed Participant Survey Results

Did you participate in any of these offerings?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	237 100.0	182 100.0	15 100.0	37 100.0	156 100.0	79 100.0	56 100.0	86 100.0	88 100.0	143 100.0	45 100.0	24 100.0	55 100.0	76 100.0	92 100.0	104 100.0	128 100.0	84 100.0	88 100.0	46 100.0
Yes	76 32.1	62 34.1	4 26.7	8 21.6	58 37.2 F	16 20.3	15 26.8	27 31.4	30 34.1	43 30.1	15 33.3	11 45.8	13 23.6	22 28.9	36 39.1 M	32 30.8	40 31.2	24 28.6	29 33.0	16 34.8
No	161 67.9	120 65.9	11 73.3	29 78.4	98 62.8	63 79.7 E	41 73.2	59 68.6	58 65.9	100 69.9	30 66.7	13 54.2	42 76.4 O	54 71.1	56 60.9	72 69.2	88 68.8	60 71.4	59 67.0	30 65.2
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qmil2 Page 60

DEC Free LED Detailed Participant Survey Results

In which offering(s) did you participate?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	76 100.0	62 100.0	4 100.0	8 100.0	58 100.0	16 100.0	15 100.0	27 100.0	30 100.0	43 100.0	15 100.0	11 100.0	13 100.0	22 100.0	36 100.0	32 100.0	40 100.0	24 100.0	29 100.0	16 100.0
Duke Energy online CFL/LED store	23 30.3	19 30.6	2 50.0	2 25.0	17 29.3	5 31.2	4 26.7	10 37.0	8 26.7	12 27.9	5 33.3	4 36.4	3 23.1	7 31.8	11 30.6	13 40.6 Q	8 20.0	6 25.0	8 27.6	7 43.8
Home energy call/home energy assessment	14 18.4	14 22.6	-	-	13 22.4 F	1 6.2	1 6.7	6 22.2	7 23.3 G	9 20.9	2 13.3	3 27.3	1 7.7	6 27.3	7 19.4	3 9.4	11 27.5 P	3 12.5	7 24.1	3 18.8
Power manager program	8 10.5	8 12.9	-	-	7 12.1	1 6.2	3 20.0	2 7.4	3 10.0	2 4.7	6 40.0 J	-	-	3 13.6	5 13.9	4 12.5	4 10.0	-	5 17.2	3 18.8
Appliance recycling program	4 5.3	3 4.8	1 25.0	-	3 5.2	1 6.2	2 13.3	1 3.7	1 3.3	2 4.7	2 13.3	-	-	2 9.1	2 5.6	2 6.2	2 5.0	1 4.2	2 6.9	1 6.2
Online home energy report	36 47.4	28 45.2	1 25.0	6 75.0 BC	25 43.1	10 62.5	11 73.3 HI	11 40.7	11 36.7	25 58.1 L	6 40.0	2 18.2	9 69.2 NO	9 40.9	15 41.7	17 53.1	17 42.5	14 58.3 T	14 48.3	5 31.2
Other, specify	9 11.8	8 12.9	-	-	7 12.1	2 12.5	1 6.7	3 11.1	5 16.7	3 7.0	1 6.7	3 27.3	1 7.7	3 13.6	5 13.9	2 6.2	7 17.5	3 12.5	2 6.9	3 18.8
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qm113 Page 61

DEC Free LED Detailed Participant Survey Results

Prior to taking this survey, were you aware that Duke Energy has an online store where customers can purchase LED bulbs at discounted prices?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
	SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+	
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	366 100.0	269 100.0	24 100.0	71 100.0	209 100.0	155 100.0	88 100.0	133 100.0	139 100.0	234 100.0	65 100.0	20 100.0	104 100.0	125 100.0	125 100.0	191 100.0	170 100.0	170 100.0	107 100.0	66 100.0
Yes	128 35.0	96 35.7	10 41.7	20 28.2	83 39.7 F	44 28.4	28 31.8	52 39.1	47 33.8	76 32.5	26 40.0	9 45.0	35 33.7	41 32.8	47 37.6	77 40.3 Q	50 29.4	53 31.2	41 38.3	26 39.4
No	228 62.3	167 62.1	14 58.3	47 66.2	121 57.9	106 68.4 E	58 65.9	77 57.9	89 64.0	152 65.0	37 56.9	10 50.0	69 66.3	82 65.6	70 56.0	108 56.5	116 68.2 P	112 65.9	64 59.8	38 57.6
Don't know/Not sure	10 2.7	6 2.2	-	4 5.6	5 2.4	5 3.2	2 2.3	4 3.0	3 2.2	6 2.6	2 3.1	1 5.0	-	2 1.6	8 6.4 N	6 3.1	4 2.4	5 2.9	2 1.9	2 3.0
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs1 Page 62

DEC Free LED Detailed Participant Survey Results

From the time you requested free LEDs from Duke Energy, approximately how long did it take for you to receive your bulbs in the mail?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
1 week	93 19.3	70 19.2	5 17.9	18 20.7	48 16.4	44 23.5 E	21 17.8	33 19.0	38 21.0	62 20.4	13 14.8	7 20.0	28 21.2	34 21.1	29 17.2	45 18.8	47 19.9	44 22.1	30 18.5	15 16.9
2 weeks	137 28.4	103 28.3	13 46.4 BD	20 23.0	87 29.8	48 25.7	35 29.7	50 28.7	47 26.0	95 31.2 L	24 27.3	6 17.1	37 28.0	46 28.6	49 29.0	80 33.5 Q	54 22.9	61 30.7	44 27.2	24 27.0
3 weeks	53 11.0	43 11.8	4 14.3	6 6.9	31 10.6	22 11.8	12 10.2	24 13.8	17 9.4	31 10.2	12 13.6	6 17.1	14 10.6	18 11.2	20 11.8	24 10.0	29 12.3	17 8.5	22 13.6	10 11.2
4 weeks	25 5.2	18 4.9	-	7 8.0	10 3.4	15 8.0 E	8 6.8	7 4.0	9 5.0	19 6.2	3 3.4	1 2.9	5 3.8	8 5.0	10 5.9	13 5.4	12 5.1	13 6.5	7 4.3	3 3.4
5 weeks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6 weeks	4 0.8	3 0.8	-	1 1.1	3 1.0	1 0.5	1 0.8	2 1.1	1 0.6	2 0.7	1 1.1	-	1 0.8	1 0.6	1 0.6	2 0.8	2 0.8	1 0.5	2 1.2	1 1.1
7 weeks	1 0.2	-	-	1 1.1	-	1 0.5	1 0.8	-	-	1 0.3	-	-	-	-	1 0.6	-	1 0.4	-	-	1 1.1
8 weeks	2 0.4	2 0.5	-	-	1 0.3	1 0.5	1 0.8	-	1 0.6	1 0.3	1 1.1	-	1 0.8	1 0.6	-	1 0.4	1 0.4	1 0.5	1 0.6	-
More than 8 weeks	1 0.2	-	-	1 1.1	-	1 0.5	-	-	1 0.6	1 0.3	-	-	-	1 0.6	-	-	1 0.4	-	1 0.6	-
Cannot remember how long it took	166 34.4	125 34.3	6 21.4	33 37.9 C	112 38.4 F	54 28.9	39 33.1	58 33.3	67 37.0	92 30.3	34 38.6	15 42.9	46 34.8	52 32.3	59 34.9	74 31.0	89 37.7	62 31.2	55 34.0	35 39.3

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qsl Page 63

(Continued)

DEC Free LED Detailed Participant Survey Results

From the time you requested free LEDs from Duke Energy, approximately how long did it take for you to receive your bulbs in the mail?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age		Education		Income			
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	2.16	2.14	1.95	2.33	2.12	2.23	2.28	2.11	2.12	2.16	2.28	2.05	2.07	2.16	2.18	2.12	2.22	2.07	2.25	2.19

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs2 Page 64

DEC Free LED Detailed Participant Survey Results

How satisfied were you with how long it took to receive the free LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Net 0-4	15 3.1	12 3.3	1 3.6	2 2.3	9 3.1	6 3.2	4 3.4	5 2.9	6 3.3	7 2.3	3 3.4	1 2.9	3 2.3	6 3.7	5 3.0	7 2.9	8 3.4	6 3.0	6 3.7	3 3.4
0 - Extremely dissatisfied	4 0.8	4 1.1	-	-	3 1.0	1 0.5	2 1.7	-	2 1.1	1 0.3	1 1.1	1 2.9	-	1 0.6	3 1.8	1 0.4	3 1.3	2 1.0	-	2 2.2
1	2 0.4	2 0.5	-	-	1 0.3	1 0.5	-	1 0.6	1 0.6	-	1 1.1	-	-	1 0.6	1 0.6	2 0.8	-	2 1.0	-	-
2	3 0.6	2 0.5	-	1 1.1	2 0.7	1 0.5	-	2 1.1	1 0.6	1 0.3	1 1.1	-	1 0.8	1 0.6	-	1 0.4	2 0.8	-	3 1.9	-
3	3 0.6	2 0.5	-	1 1.1	1 0.3	2 1.1	-	2 1.1	1 0.6	3 1.0	-	-	1 0.8	2 1.2	-	1 0.4	2 0.8	1 0.5	1 0.6	1 1.1
4	3 0.6	2 0.5	1 3.6	-	2 0.7	1 0.5	2 1.7	-	1 0.6	2 0.7	-	-	1 0.8	1 0.6	1 0.6	2 0.8	1 0.4	1 0.5	2 1.2	-
Net 5-6	41 8.5	33 9.1	2 7.1	6 6.9	29 9.9	12 6.4	4 3.4	20 11.5 G	14 7.7 G	19 6.2	13 14.8 J	5 14.3	14 10.6	11 6.8	12 7.1	12 5.0	28 11.9 P	16 8.0	12 7.4	7 7.9
5	25 5.2	18 4.9	2 7.1	5 5.7	17 5.8	8 4.3	1 0.8	10 5.7 G	12 6.6 G	10 3.3	9 10.2 J	3 8.6	7 5.3	6 3.7	9 5.3	6 2.5	19 8.1 P	8 4.0	7 4.3	5 5.6
6	16 3.3	15 4.1 D	-	1 1.1	12 4.1	4 2.1	3 2.5	10 5.7 I	2 1.1	9 3.0	4 4.5	2 5.7	7 5.3	5 3.1	3 1.8	6 2.5	9 3.8	8 4.0	5 3.1	2 2.2
Net 7-10	426 88.4	319 87.6	25 89.3	79 90.8	254 87.0	169 90.4	110 93.2 H	149 85.6	161 89.0	278 91.4 K	72 81.8	29 82.9	115 87.1	144 89.4	152 89.9	220 92.1 O	200 84.7	177 88.9	144 88.9	79 88.8

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs2 Page 65

(Continued)

DEC Free LED Detailed Participant Survey Results

How satisfied were you with how long it took to receive the free LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
7	34 7.1	21 5.8	3 10.7	9 10.3	18 6.2	16 8.6	11 9.3	15 8.6	8 4.4	25 8.2 L	5 5.7	1 2.9	13 9.8 N	6 3.7	14 8.3 N	16 6.7	18 7.6	14 7.0	11 6.8	5 5.6
8	66 13.7	51 14.0	-	15 17.2	38 13.0	28 15.0	14 11.9	30 17.2 I	20 11.0	41 13.5	9 10.2	6 17.1	24 18.2 N	12 7.5	27 16.0 N	29 12.1	36 15.3	25 12.6	19 11.7	18 20.2 S
9	61 12.7	52 14.3 D	2 7.1	7 8.0	40 13.7	20 10.7	14 11.9	24 13.8	22 12.2	37 12.2	13 14.8	6 17.1	10 7.6	24 14.9 M	24 14.2 M	32 13.4	28 11.9	20 10.1	19 11.7	19 21.3 RS
10 - Extremely satisfied	265 55.0	195 53.6	20 71.4 B	48 55.2	158 54.1	105 56.1	71 60.2 H	80 46.0	111 61.3 H	175 57.6	45 51.1	16 45.7	68 51.5	102 63.4 MO	87 51.5	143 59.8 Q	118 50.0	118 59.3 T	95 58.6 T	37 41.6
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	8.74	8.72	9.04	8.76	8.71	8.79	8.95 H	8.52	8.87 H	8.91 K	8.48	8.46	8.63	8.99 M	8.69	8.97 Q	8.51	8.82	8.84	8.54

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST

T-Test for Means, Z-Test for Percentages

Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qs3 Page 66

DEC Free LED Detailed Participant Survey Results

After you received your free LEDs from Duke Energy, how often did you contact Duke Energy or program staff with questions?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Never	462	350	26	83	279	180	113	167	174	290	84	34	128	156	159	228	227	188	158	85
	95.9	96.2	92.9	95.4	95.5	96.3	95.8	96.0	96.1	95.4	95.5	97.1	97.0	96.9	94.1	95.4	96.2	94.5	97.5	95.5
Once	15	11	2	2	11	4	3	6	5	10	3	1	4	3	7	8	7	8	3	3
	3.1	3.0	7.1	2.3	3.8	2.1	2.5	3.4	2.8	3.3	3.4	2.9	3.0	1.9	4.1	3.3	3.0	4.0	1.9	3.4
2 or 3 times	3	2	-	1	2	1	-	1	2	2	1	-	-	2	1	1	2	1	1	1
	0.6	0.5		1.1	0.7	0.5		0.6	1.1	0.7	1.1			1.2	0.6	0.4	0.8	0.5	0.6	1.1
4 times or more	1	-	-	1	-	1	1	-	-	1	-	-	-	-	1	1	-	1	-	-
	0.2			1.1		0.5	0.8			0.3					0.6	0.4		0.5		
Don't know/Not sure	1	1	-	-	-	1	1	-	-	1	-	-	-	-	1	1	-	1	-	-
	0.2	0.3				0.5	0.8			0.3					0.6	0.4		0.5		
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs4 Page 67

DEC Free LED Detailed Participant Survey Results

How did you contact them?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	19 100.0	13 100.0	2 100.0	4 100.0	13 100.0	6 100.0	4 100.0	7 100.0	7 100.0	13 100.0	4 100.0	1 100.0	4 100.0	5 100.0	9 100.0	10 100.0	9 100.0	10 100.0	4 100.0	4 100.0
Phone	16 84.2	11 84.6	2 100.0	3 75.0	12 92.3	4 66.7	3 75.0	7 100.0	5 71.4	11 84.6	3 75.0	1 100.0	4 100.0	3 60.0	8 88.9	8 80.0	8 88.9	8 80.0	3 75.0	4 100.0
Email or fax	3 15.8	2 15.4	-	1 25.0	1 7.7	2 33.3	1 25.0	-	2 28.6	2 15.4	1 25.0	-	-	2 40.0	1 11.1	2 20.0	1 11.1	2 20.0	1 25.0	-
Letter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
In person	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs4a Page 68

DEC Free LED Detailed Participant Survey Results

Why did you contact Duke Energy?

	Why did you contact Duke Energy?																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	19 100.0	13 100.0	2 100.0	4 100.0	13 100.0	6 100.0	4 100.0	7 100.0	7 100.0	13 100.0	4 100.0	1 100.0	4 100.0	5 100.0	9 100.0	10 100.0	9 100.0	10 100.0	4 100.0	4 100.0
Bulbs were broken	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Didn't like the light bulbs I received	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I received the wrong bulbs	1 5.3	1 7.7	-	-	-	1 16.7	-	-	1 14.3	1 7.7	-	-	-	1 20.0	-	1 10.0	-	1 10.0	-	-
Other, specify	17 89.5	12 92.3	1 50.0	4 100.0	12 92.3	5 83.3	3 75.0	7 100.0	6 85.7	11 84.6	4 100.0	1 100.0	4 100.0	4 80.0	8 88.9	9 90.0	8 88.9	8 80.0	4 100.0	4 100.0
Don't know/Not sure	1 5.3	-	1 50.0	-	1 7.7	-	1 25.0	-	-	1 7.7	-	-	-	-	1 11.1	-	1 11.1	1 10.0	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs5 Page 69

DEC Free LED Detailed Participant Survey Results

And how satisfied were you with your communications with Duke Energy and program staff?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	19 100.0	13 100.0	2 100.0	4 100.0	13 100.0	6 100.0	4 100.0	7 100.0	7 100.0	13 100.0	4 100.0	1 100.0	4 100.0	5 100.0	9 100.0	10 100.0	9 100.0	10 100.0	4 100.0	4 100.0
Net 0-4	2 10.5	1 7.7	-	1 25.0	1 7.7	1 16.7	1 25.0	-	1 14.3	1 7.7	1 25.0	-	-	-	2 22.2	1 10.0	1 11.1	1 10.0	-	1 25.0
0 - Extremely dissatisfied	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	2 10.5	1 7.7	-	1 25.0	1 7.7	1 16.7	1 25.0	-	1 14.3	1 7.7	1 25.0	-	-	-	2 22.2	1 10.0	1 11.1	1 10.0	-	1 25.0
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net 5-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net 7-10	17 89.5	12 92.3	2 100.0	3 75.0	12 92.3	5 83.3	3 75.0	7 100.0	6 85.7	12 92.3	3 75.0	1 100.0	4 100.0	5 100.0	7 77.8	9 90.0	8 88.9	9 90.0	4 100.0	3 75.0
7	3 15.8	2 15.4	1 50.0	-	2 15.4	1 16.7	-	-	2 28.6	1 7.7	1 25.0	1 100.0	-	1 20.0	1 11.1	1 10.0	2 22.2	-	1 25.0	1 25.0

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs5 Page 70

(Continued)

DEC Free LED Detailed Participant Survey Results

And how satisfied were you with your communications with Duke Energy and program staff?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
8	2 10.5	1 7.7	-	1 25.0	1 7.7	1 16.7	-	2 28.6	-	2 15.4	-	-	-	-	2 22.2	1 10.0	1 11.1	1 10.0	-	1 25.0
9	1 5.3	1 7.7	-	-	1 7.7	-	-	1 14.3	-	1 7.7	-	-	-	-	1 11.1	1 10.0	-	-	1 25.0	-
10 - Extremely satisfied	11 57.9	8 61.5	1 50.0	2 50.0	8 61.5	3 50.0	3 75.0	4 57.1	4 57.1	8 61.5	2 50.0	-	4 100.0 0	4 80.0 0	3 33.3	6 60.0	5 55.6	8 80.0 T	2 50.0	1 25.0
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	8.42	8.69	8.50	7.50	8.69	7.83	8.00	9.29	8.00	8.77	7.25	7.00	10.00 0	9.40	7.33	8.60	8.22	9.00	9.00	6.75

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs7 Page 71

DEC Free LED Detailed Participant Survey Results

Have you noticed any savings on your electric bill since installing your free LED(s)?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	460 100.0	344 100.0	28 100.0	85 100.0	276 100.0	181 100.0	115 100.0	162 100.0	175 100.0	290 100.0	85 100.0	33 100.0	125 100.0	155 100.0	162 100.0	233 100.0	220 100.0	192 100.0	153 100.0	86 100.0
Yes	189 41.1	133 38.7	12 42.9	42 49.4 B	94 34.1	93 51.4 E	45 39.1	67 41.4	74 42.3	121 41.7 K	23 27.1	12 36.4	56 44.8	62 40.0	63 38.9	111 47.6 Q	74 33.6	99 51.6 ST	56 36.6 T	21 24.4
No	263 57.2	206 59.9 D	15 53.6	41 48.2	176 63.8 F	86 47.5	66 57.4	91 56.2	101 57.7	164 56.6	61 71.8 J	20 60.6	67 53.6	91 58.7	95 58.6	119 51.1	141 64.1 P	88 45.8	95 62.1 R	65 75.6 RS
Don't know/Not sure	1 0.2	-	1 3.6	-	1 0.4	-	1 0.9	-	-	1 0.3	-	-	-	-	1 0.6	-	1 0.5	1 0.5	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing Response	7 1.5	5 1.5	-	2 2.4	5 1.8	2 1.1	3 2.6	4 2.5	-	4 1.4	1 1.2	1 3.0	2 1.6	2 1.3	3 1.9	3 1.3	4 1.8	4 2.1	2 1.3	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs8 Page 72

DEC Free LED Detailed Participant Survey Results

How satisfied are you with any savings you noticed on your electric bill since installing your free LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)
Total	189 100.0	133 100.0	12 100.0	42 100.0	94 100.0	93 100.0	45 100.0	67 100.0	74 100.0	121 100.0	23 100.0	12 100.0	56 100.0	62 100.0	63 100.0	111 100.0	74 100.0	99 100.0	56 100.0	21 100.0
Net 0-4	6 3.2	3 2.3	-	3 7.1	3 3.2	3 3.2	1 2.2	2 3.0	3 4.1	4 3.3	1 4.3	1 8.3	4 7.1	-	2 3.2	1 0.9	5 6.8 P	4 4.0	1 1.8	1 4.8
0 - Extremely dissatisfied	2 1.1	1 0.8	-	1 2.4	1 1.1	1 1.1	1 2.2	-	1 1.4	1 0.8	-	1 8.3	1 1.8	-	1 1.6	-	2 2.7	1 1.0	-	1 4.8
1	1 0.5	1 0.8	-	-	1 1.1	-	-	1 1.5	-	-	1 4.3	-	-	-	1 1.6	1 0.9	-	1 1.0	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	3 1.6	1 0.8	-	2 4.8	1 1.1	2 2.2	-	1 1.5	2 2.7	3 2.5	-	-	3 5.4	-	-	-	3 4.1	2 2.0	1 1.8	-
Net 5-6	22 11.6	16 12.0	-	6 14.3	10 10.6	12 12.9	6 13.3	7 10.4	9 12.2	13 10.7	1 4.3	4 33.3 K	8 14.3	9 14.5	5 7.9	14 12.6	8 10.8	9 9.1	9 16.1	3 14.3
5	12 6.3	10 7.5	-	2 4.8	7 7.4	5 5.4	3 6.7	3 4.5	6 8.1	7 5.8	1 4.3	3 25.0	4 7.1	5 8.1	3 4.8	8 7.2	4 5.4	5 5.1	6 10.7	1 4.8
6	10 5.3	6 4.5	-	4 9.5	3 3.2	7 7.5	3 6.7	4 6.0	3 4.1	6 5.0	-	1 8.3	4 7.1	4 6.5	2 3.2	6 5.4	4 5.4	4 4.0	3 5.4	2 9.5
Net 7-10	155 82.0	110 82.7	12 100.0 BD	31 73.8	81 86.2	72 77.4	36 80.0	56 83.6	60 81.1	102 84.3 L	20 87.0 L	6 50.0	43 76.8	51 82.3	53 84.1	91 82.0	60 81.1	81 81.8	45 80.4	17 81.0

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs8 Page 73  
(Continued)  
DEC Free LED Detailed Participant Survey Results

How satisfied are you with any savings you noticed on your electric bill since installing your free LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
7	19 10.1	10 7.5	2 16.7	7 16.7	8 8.5	11 11.8	2 4.4	7 10.4	10 13.5 G	11 9.1	4 17.4	-	7 12.5	7 11.3	5 7.9	12 10.8	7 9.5	8 8.1	8 14.3	2 9.5
8	29 15.3	20 15.0	2 16.7	7 16.7	10 10.6	19 20.4 E	5 11.1	11 16.4	12 16.2	20 16.5	4 17.4	-	9 16.1	11 17.7	8 12.7	16 14.4	12 16.2	18 18.2 T	8 14.3	1 4.8
9	25 13.2	20 15.0 D	2 16.7	2 4.8	19 20.2 F	6 6.5	8 17.8	11 16.4	6 8.1	14 11.6	5 21.7	2 16.7	6 10.7	5 8.1	10 15.9	12 10.8	13 17.6	12 12.1	5 8.9	5 23.8
10 - Extremely satisfied	82 43.4	60 45.1	6 50.0	15 35.7	44 46.8	36 38.7	21 46.7	27 40.3	32 43.2	57 47.1	7 30.4	4 33.3	21 37.5	28 45.2	30 47.6	51 45.9	28 37.8	43 43.4	24 42.9	9 42.9
I didn't notice any savings	6 3.2	4 3.0	-	2 4.8	-	6 6.5	2 4.4	2 3.0	2 2.7	2 1.7	1 4.3	1 8.3	1 1.8	2 3.2	3 4.8	5 4.5	1 1.4	5 5.1	1 1.8	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	8.43	8.53	9.00 D	7.88	8.56	8.25	8.58	8.46	8.28	8.54	8.23	7.18	8.02	8.52	8.62	8.56	8.19	8.47	8.31	8.29

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qs9 Page 74

DEC Free LED Detailed Participant Survey Results

How satisfied are you with your new free LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Net 0-4	7 1.5	7 1.9	-	-	6 2.1	1 0.5	1 0.8	2 1.1	4 2.2	3 1.0	1 1.1	2 5.7	1 0.8	2 1.2	4 2.4	5 2.1	2 0.8	3 1.5	1 0.6	1 1.1
0 - Extremely dissatisfied	4 0.8	4 1.1	-	-	3 1.0	1 0.5	1 0.8	-	3 1.7	1 0.3	1 1.1	1 2.9	1 0.8	1 0.6	2 1.2	2 0.8	2 0.8	3 1.5	-	1 1.1
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1 0.2	1 0.3	-	-	1 0.3	-	-	1 0.6	-	1 0.3	-	-	-	-	1 0.6	1 0.4	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	2 0.4	2 0.5	-	-	2 0.7	-	-	1 0.6	1 0.6	1 0.3	-	1 2.9	-	1 0.6	1 0.6	2 0.8	-	-	1 0.6	-
Net 5-6	22 4.6	17 4.7	1 3.6	4 4.6	12 4.1	10 5.3	3 2.5	9 5.2	8 4.4	12 3.9	4 4.5	2 5.7	9 6.8 0	6 3.7	4 2.4	8 3.3	14 5.9	9 4.5	6 3.7	5 5.6
5	12 2.5	10 2.7	1 3.6	1 1.1	6 2.1	6 3.2	3 2.5	4 2.3	4 2.2	7 2.3	1 1.1	1 2.9	3 2.3	3 1.9	4 2.4	5 2.1	7 3.0	6 3.0	3 1.9	2 2.2
6	10 2.1	7 1.9	-	3 3.4	6 2.1	4 2.1	-	5 2.9	4 2.2	5 1.6	3 3.4	1 2.9	6 4.5	3 1.9	-	3 1.3	7 3.0	3 1.5	3 1.9	3 3.4
Net 7-10	452 93.8	339 93.1	27 96.4	83 95.4	273 93.5	176 94.1	113 95.8	163 93.7	169 93.4	289 95.1	83 94.3	31 88.6	122 92.4	152 94.4	161 95.3	225 94.1	220 93.2	186 93.5	155 95.7	83 93.3
7	21 4.4	12 3.3	1 3.6	8 9.2 B	8 2.7	13 7.0 E	4 3.4	7 4.0	10 5.5	14 4.6 K	1 1.1	-	9 6.8	7 4.3	5 3.0	9 3.8	12 5.1	12 6.0 T	8 4.9 T	1 1.1

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs9 Page 75  
(Continued)  
DEC Free LED Detailed Participant Survey Results

How satisfied are you with your new free LEDs?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
8	41 8.5	32 8.8	-	9 10.3	24 8.2	17 9.1	8 6.8	15 8.6	17 9.4	24 7.9	9 10.2	4 11.4	14 10.6	10 6.2	13 7.7	15 6.3	24 10.2	11 5.5	14 8.6	10 11.2
9	66 13.7	50 13.7	3 10.7	13 14.9	38 13.0	27 14.4	14 11.9	29 16.7	21 11.6	31 10.2	22 25.0 J	8 22.9 J	13 9.8	21 13.0	27 16.0	25 10.5	40 16.9 P	21 10.6	21 13.0	21 23.6 RS
10 - Extremely satisfied	324 67.2	245 67.3	23 82.1 BD	53 60.9	203 69.5	119 63.6	87 73.7 H	112 64.4	121 66.9	220 72.4 KL	51 58.0	19 54.3	86 65.2	114 70.8	116 68.6	176 73.6 Q	144 61.0	142 71.4 T	112 69.1 T	51 57.3
Don't know/Not sure	1 0.2	1 0.3	-	-	1 0.3	-	1 0.8	-	-	-	-	-	-	1 0.6	-	1 0.4	-	1 0.5	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	9.23	9.21	9.61 BD	9.17	9.26	9.17	9.43	9.23	9.13	9.34	9.20	8.83	9.11	9.34	9.28	9.33	9.12	9.24	9.35	9.15

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs11 Page 76

DEC Free LED Detailed Participant Survey Results

Finally, how satisfied with your experience receiving free LEDs from Duke Energy are you overall?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Net 0-4	6 1.2	5 1.4	1 3.6	-	4 1.4	2 1.1	2 1.7	-	4 2.2	2 0.7	1 1.1	1 2.9	1 0.8	2 1.2	3 1.8	4 1.7	2 0.8	4 2.0	1 0.6	1 1.1
0 - Extremely dissatisfied	3 0.6	3 0.8	-	-	2 0.7	1 0.5	1 0.8	-	2 1.1	-	1 1.1	1 2.9	-	1 0.6	2 1.2	1 0.4	2 0.8	2 1.0	-	1 1.1
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1 0.2	-	1 3.6	-	-	1 0.5	1 0.8	-	-	-	-	-	-	-	1 0.6	1 0.4	-	1 0.5	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	2 0.4	2 0.5	-	-	2 0.7	-	-	-	2 1.1	2 0.7	-	-	1 0.8	1 0.6	-	2 0.8	-	1 0.5	1 0.6	-
Net 5-6	8 1.7	6 1.6	1 3.6	1 1.1	3 1.0	5 2.7	-	5 2.9	2 1.1	5 1.6	-	-	3 2.3	3 1.9	1 0.6	4 1.7	4 1.7	6 3.0	1 0.6	1 1.1
5	3 0.6	3 0.8	-	-	-	3 1.6	-	2 1.1	1 0.6	1 0.3	-	-	2 1.5	1 0.6	-	3 1.3	-	3 1.5	-	-
6	5 1.0	3 0.8	1 3.6	1 1.1	3 1.0	2 1.1	-	3 1.7	1 0.6	4 1.3	-	-	1 0.8	2 1.2	1 0.6	1 0.4	4 1.7	3 1.5	1 0.6	1 1.1
Net 7-10	468 97.1	353 97.0	26 92.9	86 98.9	285 97.6	180 96.3	116 98.3	169 97.1	175 96.7	297 97.7	87 98.9	34 97.1	128 97.0	156 96.9	165 97.6	231 96.7	230 97.5	189 95.0	160 98.8	87 97.8

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs11 Page 77

(Continued)

DEC Free LED Detailed Participant Survey Results

Finally, how satisfied with your experience receiving free LEDs from Duke Energy are you overall?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
7	16 3.3	10 2.7	-	6 6.9	7 2.4	9 4.8	2 1.7	4 2.3	9 5.0	11 3.6	2 2.3	2 5.7	5 3.8	6 3.7	4 2.4	4 1.7	12 5.1 P	4 2.0	8 4.9	2 2.2
8	35 7.3	26 7.1	-	9 10.3	22 7.5	13 7.0	6 5.1	14 8.0	14 7.7	19 6.2	6 6.8	4 11.4	17 12.9 NO	7 4.3	8 4.7	13 5.4	21 8.9	12 6.0	11 6.8	8 9.0
9	64 13.3	50 13.7	2 7.1	12 13.8	42 14.4	21 11.2	12 10.2	30 17.2 GI	20 11.0	27 8.9	21 23.9 J	8 22.9 J	15 11.4	19 11.8	23 13.6	23 9.6	39 16.5 P	23 11.6	17 10.5	18 20.2 RS
10 - Extremely satisfied	353 73.2	267 73.4	24 85.7 BD	59 67.8	214 73.3	137 73.3	96 81.4 HI	121 69.5	132 72.9	240 78.9 KL	58 65.9	20 57.1	91 68.9	124 77.0	130 76.9	191 79.9 Q	158 66.9	150 75.4	124 76.5 T	59 66.3
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	9.45	9.45	9.50	9.40	9.48	9.39	9.59	9.47	9.36	9.57	9.44	9.09	9.36	9.50	9.51	9.54	9.35	9.40	9.55	9.39

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST

T-Test for Means, Z-Test for Percentages

Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs13 Page 78

DEC Free LED Detailed Participant Survey Results

Based on your overall experience with Duke Energy's service, how satisfied are you with having them as your electric company?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Net 0-4	12 2.5	9 2.5	1 3.6	2 2.3	7 2.4	5 2.7	3 2.5	3 1.7	6 3.3	5 1.6	3 3.4	2 5.7	2 1.5	4 2.5	4 2.4	7 2.9	4 1.7	5 2.5	4 2.5	1 1.1
0 - Extremely dissatisfied	3 0.6	3 0.8	-	-	2 0.7	1 0.5	-	-	3 1.7	1 0.3	1 1.1	1 2.9	-	2 1.2	1 0.6	1 0.4	2 0.8	1 0.5	1 0.6	1 1.1
1	2 0.4	1 0.3	-	1 1.1	1 0.3	1 0.5	1 0.8	1 0.6	-	1 0.3	-	1 2.9	1 0.8	-	1 0.6	1 0.4	1 0.4	-	1 0.6	-
2	2 0.4	2 0.5	-	-	2 0.7	-	1 0.8	1 0.6	-	1 0.3	1 1.1	-	1 0.8	-	1 0.6	2 0.8	-	2 1.0	-	-
3	1 0.2	1 0.3	-	-	1 0.3	-	-	-	1 0.6	1 0.3	-	-	-	1 0.6	-	1 0.4	-	1 0.5	-	-
4	4 0.8	2 0.5	1 3.6	1 1.1	1 0.3	3 1.6	1 0.8	1 0.6	2 1.1	1 0.3	1 1.1	-	-	1 0.6	1 0.6	2 0.8	1 0.4	1 0.5	2 1.2	-
Net 5-6	37 7.7	26 7.1	1 3.6	10 11.5	18 6.2	19 10.2	11 9.3	14 8.0	11 6.1	25 8.2	5 5.7	2 5.7	16 12.1 NO	9 5.6	10 5.9	11 4.6	26 11.0 P	14 7.0	12 7.4	9 10.1
5	19 3.9	10 2.7	-	9 10.3 B	6 2.1	13 7.0 E	7 5.9	7 4.0	4 2.2	13 4.3 K	1 1.1	1 2.9	7 5.3 N	2 1.2	8 4.7 N	5 2.1	14 5.9 P	9 4.5	3 1.9	5 5.6
6	18 3.7	16 4.4 D	1 3.6	1 1.1	12 4.1	6 3.2	4 3.4	7 4.0	7 3.9	12 3.9	4 4.5	1 2.9	9 6.8 O	7 4.3 O	2 1.2	6 2.5	12 5.1	5 2.5	9 5.6	4 4.5
Net 7-10	433 89.8	329 90.4	26 92.9	75 86.2	267 91.4	163 87.2	104 88.1	157 90.2	164 90.6	274 90.1	80 90.9	31 88.6	114 86.4	148 91.9	155 91.7	221 92.5 Q	206 87.3	180 90.5	146 90.1	79 88.8

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qs13 Page 79

(Continued)

DEC Free LED Detailed Participant Survey Results

Based on your overall experience with Duke Energy's service, how satisfied are you with having them as your electric company?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
7	39 8.1	31 8.5	1 3.6	7 8.0	24 8.2	15 8.0	4 3.4	17 9.8 G	18 9.9 G	24 7.9	10 11.4 L	1 2.9	16 12.1 O	12 7.5	10 5.9	14 5.9	25 10.6 P	13 6.5	17 10.5	7 7.9
8	87 18.0	71 19.5 C	2 7.1	14 16.1	50 17.1	37 19.8	15 12.7	34 19.5	35 19.3	53 17.4	15 17.0	10 28.6	26 19.7 O	37 23.0 O	21 12.4	33 13.8	53 22.5 P	28 14.1	31 19.1	22 24.7 R
9	83 17.2	63 17.3	4 14.3	16 18.4	49 16.8	33 17.6	17 14.4	32 18.4	31 17.1	54 17.8	17 19.3	5 14.3	26 19.7	23 14.3	28 16.6	38 15.9	43 18.2	30 15.1	30 18.5	15 16.9
10 - Extremely satisfied	224 46.5	164 45.1	19 67.9 BD	38 43.7	144 49.3	78 41.7	68 57.6 HI	74 42.5	80 44.2	143 47.0	38 43.2	15 42.9	46 34.8	76 47.2 M	96 56.8 MN	136 56.9 Q	85 36.0	109 54.8 ST	68 42.0	35 39.3
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	8.68	8.66	9.25 BD	8.52	8.78	8.51	8.87	8.64	8.61	8.73	8.61	8.40	8.38	8.73 M	8.93 M	8.96 Q	8.40	8.85	8.61	8.53

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd1 Page 80

DEC Free LED Detailed Participant Survey Results

Which of the following best describes your home/residence?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001- 3,000	>3,000	<35	35- 54	55+	<Coll	Coll+	<50K	50K- 100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Single family detached home	317 65.8	317 87.1	-	-	240 82.2 F	76 40.6	58 49.2	114 65.5 G	140 77.3 GH	172 56.6	81 92.0 J	34 97.1 J	73 55.3	115 71.4 M	115 68.0 M	159 66.5	152 64.4	110 55.3	112 69.1 R	72 80.9 RS
Single family attached home	47 9.8	47 12.9	-	-	30 10.3	16 8.6	21 17.8 HI	13 7.5	12 6.6	38 12.5 K	5 5.7	-	14 10.6	16 9.9	16 9.5	19 7.9	28 11.9	18 9.0	15 9.3	12 13.5
Mobile home	28 5.8	-	28 100.0	-	18 6.2	10 5.3	7 5.9	14 8.0 I	7 3.9	19 6.2 K	2 2.3	1 2.9	6 4.5	7 4.3	14 8.3	23 9.6 Q	5 2.1	22 11.1 S	5 3.1	-
Apartment or condominium	87 18.0	-	-	87 100.0	3 1.0	84 44.9 E	32 27.1 HI	32 18.4 I	21 11.6	75 24.7	-	-	38 28.8 NO	23 14.3	24 14.2	37 15.5	50 21.2	48 24.1 T	30 18.5 T	5 5.6
Other, specify	2 0.4	-	-	-	1 0.3	1 0.5	-	1 0.6	1 0.6	-	-	-	1 0.8	-	-	1 0.4	1 0.4	1 0.5	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	1 0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd1a Page 81

DEC Free LED Detailed Participant Survey Results

Is your home a factory manufactured or modular home?

	Is your home a factory manufactured or modular home?																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	317 100.0	317 100.0	-	-	240 100.0	76 100.0	58 100.0	114 100.0	140 100.0	172 100.0	81 100.0	34 100.0	73 100.0	115 100.0	115 100.0	159 100.0	152 100.0	110 100.0	112 100.0	72 100.0
Yes, factory manufactured or modular	19 6.0	19 6.0	-	-	10 4.2	9 11.8 E	1 1.7	5 4.4	13 9.3 G	11 6.4	2 2.5	1 2.9	8 11.0 O	6 5.2	4 3.5	13 8.2	6 3.9	13 11.8 ST	3 2.7	2 2.8
No, conventionally built	296 93.4	296 93.4	-	-	229 95.4 F	67 88.2	57 98.3 I	108 94.7	127 90.7	161 93.6	78 96.3	33 97.1	65 89.0	109 94.8	110 95.7	145 91.2	146 96.1 P	97 88.2	109 97.3 R	69 95.8 R
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	2 0.6	2 0.6	-	-	1 0.4	-	-	1 0.9	-	-	1 1.2	-	-	-	1 0.9	1 0.6	-	-	-	1 1.4

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qdlb Page 82

DEC Free LED Detailed Participant Survey Results

How many housing units/apartments are in your building?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	87 100.0	-	-	87 100.0	3 100.0	84 100.0	32 100.0	32 100.0	21 100.0	75 100.0	-	-	38 100.0	23 100.0	24 100.0	37 100.0	50 100.0	48 100.0	30 100.0	5 100.0
1	1 1.1	-	-	1 1.1	-	1 1.2	-	1 3.1	-	1 1.3	-	-	-	-	1 4.2	1 2.7	-	1 2.1	-	-
2-3	6 6.9	-	-	6 6.9	-	6 7.1	2 6.2	3 9.4	1 4.8	4 5.3	-	-	2 5.3	1 4.3	3 12.5	3 8.1	3 6.0	4 8.3	1 3.3	-
4-9	31 35.6	-	-	31 35.6	2 66.7	29 34.5	14 43.8 H	6 18.8	10 47.6 H	26 34.7	-	-	13 34.2	9 39.1	8 33.3	17 45.9 Q	14 28.0	17 35.4	11 36.7	2 40.0
10 or more	44 50.6	-	-	44 50.6	1 33.3	43 51.2	15 46.9	21 65.6 I	8 38.1	41 54.7	-	-	21 55.3	12 52.2	11 45.8	14 37.8	30 60.0 P	23 47.9	17 56.7	3 60.0
Don't know/Not sure	5 5.7	-	-	5 5.7	-	5 6.0	1 3.1	1 3.1	2 9.5	3 4.0	-	-	2 5.3	1 4.3	1 4.2	2 5.4	3 6.0	3 6.2	1 3.3	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd2 Page 83

DEC Free LED Detailed Participant Survey Results

Do you own or rent this residence?

	Do you own or rent this residence?																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Own	292	270	18	3	292	-	61	115	111	160	79	33	56	95	126	130	158	85	108	75
	60.6	74.2	64.3	3.4	100.0		51.7	66.1	61.3	52.6	89.8	94.3	42.4	59.0	74.6	54.4	66.9	42.7	66.7	84.3
		D	D					G	G		J	J		M	MN		P		R	RS
Rent	187	92	10	84	-	187	56	59	70	143	9	2	76	66	42	109	77	113	54	14
	38.8	25.3	35.7	96.6		100.0	47.5	33.9	38.7	47.0	10.2	5.7	57.6	41.0	24.9	45.6	32.6	56.8	33.3	15.7
				BC			H			KL			NO	O		Q		ST	T	
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	3	2	-	-	-	-	1	-	-	1	-	-	-	-	1	-	1	1	-	-
	0.6	0.5					0.8			0.3					0.6		0.4	0.5		

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd2a Page 84

DEC Free LED Detailed Participant Survey Results

Do you pay your own electric bill or is it included in your rent?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	187 100.0	92 100.0	10 100.0	84 100.0	-	187 100.0	56 100.0	59 100.0	70 100.0	143 100.0	9 100.0	2 100.0	76 100.0	66 100.0	42 100.0	109 100.0	77 100.0	113 100.0	54 100.0	14 100.0
Pay bill	186 99.5	91 98.9	10 100.0	84 100.0	-	186 99.5	56 100.0	59 100.0	69 98.6	142 99.3	9 100.0	2 100.0	76 100.0	66 100.0	41 97.6	108 99.1	77 100.0	112 99.1	54 100.0	14 100.0
Included in rent	1 0.5	1 1.1	-	-	-	1 0.5	-	-	1 1.4	1 0.7	-	-	-	-	1 2.4	1 0.9	-	1 0.9	-	-
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd3 Page 85

DEC Free LED Detailed Participant Survey Results

How long have you lived in this residence?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Less than 1 year	219 45.4	155 42.6	10 35.7	53 60.9 BC	115 39.4	104 55.6 E	59 50.0	79 45.4	77 42.5	143 47.0	41 46.6	12 34.3	83 62.9 NO	73 45.3 O	56 33.1	101 42.3	116 49.2	101 50.8 S	63 38.9	41 46.1
1-3 years	140 29.0	106 29.1	5 17.9	29 33.3 C	71 24.3	68 36.4 E	27 22.9	54 31.0	58 32.0 G	93 30.6 K	19 21.6	11 31.4	42 31.8	53 32.9 O	40 23.7	72 30.1	66 28.0	51 25.6	60 37.0 RT	23 25.8
4-10 years	42 8.7	34 9.3	3 10.7	5 5.7	35 12.0 F	7 3.7	5 4.2	14 8.0	22 12.2 G	28 9.2	8 9.1	3 8.6	6 4.5	17 10.6 M	17 10.1 M	17 7.1	24 10.2	13 6.5	16 9.9	8 9.0
11-20 years	37 7.7	32 8.8	4 14.3	-	31 10.6 F	5 2.7	13 11.0 H	9 5.2	15 8.3	16 5.3	13 14.8 J	4 11.4	1 0.8	10 6.2 M	22 13.0 MN	17 7.1	19 8.1	11 5.5	14 8.6	9 10.1
More than 20 years	42 8.7	36 9.9	6 21.4	-	39 13.4 F	3 1.6	14 11.9 I	18 10.3 I	8 4.4	24 7.9	7 8.0	4 11.4	-	8 5.0	33 19.5 N	32 13.4 Q	10 4.2	23 11.6 S	9 5.6	7 7.9
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	2 0.4	1 0.3	-	-	1 0.3	-	-	-	1 0.6	-	-	1 2.9	-	-	1 0.6	-	1 0.4	-	-	1 1.1

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd4 Page 86

DEC Free LED Detailed Participant Survey Results

Including yourself, how many people currently live in your residence year-round?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
1	118 24.5	79 21.7	7 25.0	32 36.8 B	61 20.9	56 29.9 E	118 100.0	-	-	91 29.9 KL	12 13.6	2 5.7	24 18.2	32 19.9	59 34.9 MN	64 26.8	53 22.5	66 33.2 ST	35 21.6	14 15.7
2	174 36.1	127 34.9	14 50.0	32 36.8	115 39.4 F	59 31.6	-	174 100.0	-	109 35.9	35 39.8	13 37.1	56 42.4 N	35 21.7	76 45.0 N	84 35.1	89 37.7	64 32.2	57 35.2	38 42.7 R
3	75 15.6	59 16.2	3 10.7	12 13.8	40 13.7	35 18.7	-	-	75 41.4	45 14.8	12 13.6	8 22.9	25 18.9	26 16.1	23 13.6	39 16.3	36 15.3	33 16.6	25 15.4	13 14.6
4	70 14.5	60 16.5 CD	2 7.1	8 9.2	50 17.1 F	20 10.7	-	-	70 38.7	34 11.2	19 21.6 J	9 25.7 J	18 13.6 O	47 29.2 MO	5 3.0	27 11.3	43 18.2 P	19 9.5	35 21.6 R	14 15.7
5 or more	36 7.5	33 9.1 D	2 7.1	1 1.1	21 7.2	15 8.0	-	-	36 19.9	19 6.2	10 11.4	3 8.6	9 6.8	20 12.4 MO	5 3.0	24 10.0 Q	11 4.7	16 8.0	9 5.6	10 11.2
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	9 1.9	6 1.6	-	2 2.3	5 1.7	2 1.1	-	-	-	6 2.0	-	-	-	1 0.6	1 0.6	1 0.4	4 1.7	1 0.5	1 0.6	-
Mean	2.47	2.59 D	2.29	1.99	2.52	2.39	1.00	2.00	3.88 GH	2.29	2.86 J	2.94 J	2.51 O	3.00 MO	1.93	2.48	2.44	2.31	2.57 R	2.66 R

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd5 Page 87

DEC Free LED Detailed Participant Survey Results

How many people under the age of 18 live in your residence?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
0	317	232	19	65	195	121	118	156	42	210	53	22	87	70	151	158	158	138	103	58
	65.8	63.7	67.9	74.7 B	66.8	64.7	100.0 HI	89.7 I	23.2	69.1	60.2	62.9	65.9 N	43.5	89.3 MN	66.1	66.9	69.3	63.6	65.2
1	49	37	2	9	27	22	-	10	39	27	10	5	14	24	9	26	23	20	18	9
	10.2	10.2	7.1	10.3	9.2	11.8		5.7	21.5 H	8.9	11.4	14.3	10.6 O	14.9 O	5.3	10.9	9.7	10.1	11.1	10.1
2	69	58	2	9	42	27	-	-	69	39	17	6	18	46	3	30	38	27	26	13
	14.3	15.9 C	7.1	10.3	14.4	14.4			38.1	12.8	19.3	17.1	13.6 O	28.6 MO	1.8	12.6	16.1	13.6	16.0	14.6
3	20	17	2	1	14	6	-	-	20	10	5	1	10	10	-	12	8	8	6	6
	4.1	4.7 D	7.1	1.1	4.8	3.2			11.0	3.3	5.7	2.9	7.6	6.2		5.0	3.4	4.0	3.7	6.7
4	7	6	1	-	3	4	-	-	7	5	2	-	1	5	1	5	2	2	4	1
	1.5	1.6	3.6		1.0	2.1			3.9	1.6	2.3		0.8	3.1 O	0.6	2.1	0.8	1.0	2.5	1.1
5 or more	2	2	-	-	1	1	-	-	2	-	1	1	-	1	1	1	1	1	-	1
	0.4	0.5			0.3	0.5			1.1		1.1	2.9		0.6	0.6	0.4	0.4	0.5		1.1
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	18	12	2	3	10	6	-	8	2	13	-	-	2	5	4	7	6	3	5	1
	3.7	3.3	7.1	3.4	3.4	3.2		4.6 I	1.1	4.3			1.5	3.1	2.4	2.9	2.5	1.5	3.1	1.1

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd5 Page 88  
(Continued)  
DEC Free LED Detailed Participant Survey Results

How many people under the age of 18 live in your residence?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Mean	0.60	0.66 D	0.62	0.36	0.59	0.64	0.00	0.06 G	1.52 GH	0.53	0.82 J	0.59	0.65 O	1.10 MO	0.12	0.63	0.57	0.57	0.66	0.66

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd6 Page 89

DEC Free LED Detailed Participant Survey Results

Approximately when was your residence first built?

	Housing and Demographic Data by Cohort																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Before 1950	42	34	-	8	25	17	11	14	15	28	6	2	9	15	18	14	28	21	14	5
	8.7	9.3		9.2	8.6	9.1	9.3	8.0	8.3	9.2	6.8	5.7	6.8	9.3	10.7	5.9	11.9 P	10.6	8.6	5.6
1950-1959	30	28	-	2	17	13	9	13	8	19	4	2	7	11	12	19	11	15	9	5
	6.2	7.7 D		2.3	5.8	7.0	7.6	7.5	4.4	6.2	4.5	5.7	5.3	6.8	7.1	7.9	4.7	7.5	5.6	5.6
1960-1969	25	24	1	-	20	5	5	9	11	13	7	1	4	7	13	17	7	10	11	2
	5.2	6.6	3.6		6.8 F	2.7	4.2	5.2	6.1	4.3	8.0	2.9	3.0	4.3	7.7 M	7.1 Q	3.0	5.0	6.8 T	2.2
1970-1979	38	34	2	2	31	7	11	13	14	29	7	1	9	13	15	21	17	13	13	9
	7.9	9.3 D	7.1	2.3	10.6 F	3.7	9.3	7.5	7.7	9.5 L	8.0	2.9	6.8	8.1	8.9	8.8	7.2	6.5	8.0	10.1
1980-1989	66	54	5	7	45	21	11	26	27	47	11	6	20	18	26	32	34	22	25	15
	13.7	14.8 D	17.9	8.0	15.4	11.2	9.3	14.9	14.9	15.5	12.5	17.1	15.2	11.2	15.4	13.4	14.4	11.1	15.4	16.9
1990-1999	60	45	11	4	46	14	17	19	24	41	13	4	18	16	26	34	25	30	20	8
	12.4	12.4 D	39.3 BD	4.6	15.8 F	7.5	14.4	10.9	13.3	13.5	14.8	11.4	13.6	9.9	15.4	14.2	10.6	15.1	12.3	9.0
2000-2005	41	27	6	8	27	12	8	15	16	23	10	3	7	20	9	17	22	15	11	10
	8.5	7.4	21.4 B	9.2	9.2	6.4	6.8	8.6	8.8	7.6	11.4	8.6	5.3	12.4 MO	5.3	7.1	9.3	7.5	6.8	11.2
2006-2009	39	31	-	8	24	15	12	14	13	25	10	3	11	13	12	16	22	9	19	9
	8.1	8.5		9.2	8.2	8.0	10.2	8.0	7.2	8.2	11.4	8.6	8.3	8.1	7.1	6.7	9.3	4.5	11.7 R	10.1

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.



Appendix C. Detailed Survey Results

Table qd6 Page 90

(Continued)

DEC Free LED Detailed Participant Survey Results

Approximately when was your residence first built?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
2010 or later	63 13.1	58 15.9	- D	5 5.7	52 17.8	11 5.9	12 10.2	25 14.4	25 13.8	27 8.9	20 22.7	13 37.1	17 12.9	22 13.7	20 11.8	22 9.2	40 16.9	12 6.0	24 14.8	21 23.6
Don't know/Not sure	77 16.0	29 8.0	3 10.7	43 49.4	5 1.7	72 38.5	22 18.6	26 14.9	28 15.5	52 17.1	-	-	30 22.7	26 16.1	18 10.7	47 19.7	30 12.7	52 26.1	16 9.9	5 5.6
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	1 0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd7 Page 91

DEC Free LED Detailed Participant Survey Results

Approximately how many square feet is your residence?

	Housing Characteristics																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Less than 1,001 sqft	45 9.3	15 4.1	6 21.4 B	24 27.6 B	11 3.8	34 18.2 E	24 20.3 HI	15 8.6 I	5 2.8	45 14.8	-	-	15 11.4	14 8.7	16 9.5	19 7.9	26 11.0	26 13.1 T	15 9.3 T	3 3.4
Between 1,001 and 2,000 sqft	189 39.2	161 44.2 CD	7 25.0	21 24.1	136 46.6 F	52 27.8	44 37.3	77 44.3	65 35.9	189 62.2	-	-	60 45.5	59 36.6	67 39.6	97 40.6	91 38.6	68 34.2	83 51.2 RT	29 32.6
Between 2,001 and 3,000 sqft	82 17.0	81 22.3 C	1 3.6	-	77 26.4 F	5 2.7	12 10.2	34 19.5 G	36 19.9 G	-	82 93.2	-	12 9.1	34 21.1 M	33 19.5 M	29 12.1	52 22.0 P	10 5.0	36 22.2 R	32 36.0 RS
Between 3,001 and 4,000 sqft	24 5.0	24 6.6	-	-	23 7.9 F	1 0.5	1 0.8	10 5.7 G	13 7.2 G	-	-	24 68.6	1 0.8	9 5.6 M	11 6.5 M	6 2.5	18 7.6 P	1 0.5	5 3.1 R	16 18.0 RS
Between 4,001 and 5,000 sqft	4 0.8	4 1.1	-	-	4 1.4	-	-	1 0.6	3 1.7	-	-	4 11.4	-	2 1.2	2 1.2	-	4 1.7	1 0.5	-	2 2.2
Greater than 5,000 sqft	2 0.4	2 0.5	-	-	2 0.7	-	-	-	2 1.1	-	-	2 5.7	-	1 0.6	1 0.6	-	2 0.8	-	-	2 2.2
Don't know/Not sure	131 27.2	73 20.1	14 50.0 B	42 48.3 B	37 12.7	94 50.3 E	36 30.5 H	37 21.3	56 30.9 H	70 23.0 K	6 6.8	5 14.3	43 32.6 O	41 25.5	39 23.1	88 36.8 Q	41 17.4	91 45.7 ST	23 14.2 T	5 5.6
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	5 1.0	4 1.1	-	-	2 0.7	1 0.5	1 0.8	-	1 0.6	-	-	-	1 0.8	1 0.6	-	-	2 0.8	2 1.0	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd8 Page 92

DEC Free LED Detailed Participant Survey Results

Would you estimate the square footage of your residence to be...

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	131 100.0	73 100.0	14 100.0	42 100.0	37 100.0	94 100.0	36 100.0	37 100.0	56 100.0	70 100.0	6 100.0	5 100.0	43 100.0	41 100.0	39 100.0	88 100.0	41 100.0	91 100.0	23 100.0	5 100.0
Less than 1,000 sq. ft.	21 16.0	9 12.3	3 21.4	9 21.4	3 8.1	18 19.1 E	9 25.0 H	3 8.1	8 14.3	21 30.0	-	-	10 23.3	6 14.6	5 12.8	17 19.3	4 9.8	16 17.6	5 21.7	-
Between 1,001 and 2,000 sq. ft.	49 37.4	25 34.2	3 21.4	21 50.0 BC	10 27.0	39 41.5	14 38.9	14 37.8	20 35.7	49 70.0	-	-	16 37.2	16 39.0	15 38.5	32 36.4	17 41.5	33 36.3	10 43.5	2 40.0
Between 2,001 and 3,000 sq. ft.	6 4.6	5 6.8	1 7.1	-	2 5.4	4 4.3	-	1 2.7	5 8.9	-	6 100.0	-	-	5 12.2	-	3 3.4	2 4.9	2 2.2	3 13.0	-
Between 3,001 and 4,000 sq. ft.	5 3.8	4 5.5	1 7.1	-	4 10.8 F	1 1.1	1 2.8	2 5.4	2 3.6	-	-	5 100.0	-	1 2.4	4 10.3	2 2.3	3 7.3	2 2.2	-	2 40.0 R
Between 4,001 and 5,000 sq. ft.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greater than 5,000 sq. ft.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Don't know/Not sure	50 38.2	30 41.1	6 42.9	12 28.6	18 48.6	32 34.0	12 33.3	17 45.9	21 37.5	-	-	-	17 39.5	13 31.7	15 38.5	34 38.6	15 36.6	38 41.8 S	5 21.7	1 20.0
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd9 Page 93

DEC Free LED Detailed Participant Survey Results

In what year were you born?

	In what year were you born?																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Before 1950	55	45	5	5	44	10	23	25	6	29	13	6	-	-	55	34	20	29	13	7
	11.4	12.4	17.9	5.7	15.1	5.3	19.5	14.4	3.3	9.5	14.8	17.1			32.5	14.2	8.5	14.6	8.0	7.9
			D		F		I	I								Q		ST		
1950-1959	89	65	9	15	63	26	28	42	19	55	17	9	-	-	89	57	32	42	24	20
	18.5	17.9	32.1	17.2	21.6	13.9	23.7	24.1	10.5	18.1	19.3	25.7			52.7	23.8	13.6	21.1	14.8	22.5
					F		I	I								Q				
1960-1969	73	59	2	12	49	24	18	26	28	44	16	7	-	48	25	40	33	24	25	18
	15.1	16.2	7.1	13.8	16.8	12.8	15.3	14.9	15.5	14.5	18.2	20.0		29.8	14.8	16.7	14.0	12.1	15.4	20.2
			C											O						R
1970-1979	85	69	4	12	45	40	15	14	56	51	19	8	-	85	-	37	48	28	36	18
	17.6	19.0	14.3	13.8	15.4	21.4	12.7	8.0	30.9	16.8	21.6	22.9		52.8		15.5	20.3	14.1	22.2	20.2
									GH										R	
1980-1989	111	83	6	21	64	47	18	41	52	83	18	2	83	28	-	48	63	44	44	23
	23.0	22.8	21.4	24.1	21.9	25.1	15.3	23.6	28.7	27.3	20.5	5.7	62.9	17.4		20.1	26.7	22.1	27.2	25.8
								G	G	L	L		N			P				
1990 or later	49	28	1	20	12	37	13	19	17	37	1	-	49	-	-	18	31	30	17	1
	10.2	7.7	3.6	23.0	4.1	19.8	11.0	10.9	9.4	12.2	1.1		37.1			7.5	13.1	15.1	10.5	1.1
				BC		E				K						P		T	T	
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	20	15	1	2	15	3	3	7	3	5	4	3	-	-	-	5	9	2	3	2
	4.1	4.1	3.6	2.3	5.1	1.6	2.5	4.0	1.7	1.6	4.5	8.6				2.1	3.8	1.0	1.9	2.2
					F															

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd10 Page 94

DEC Free LED Detailed Participant Survey Results

What is your highest level of education?

	What is your highest level of education?																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Less than a high school degree	13 2.7	10 2.7	1 3.6	2 2.3	6 2.1	7 3.7	5 4.2	3 1.7	5 2.8	8 2.6	-	-	1 0.8	5 3.1	7 4.1 M	13 5.4	-	12 6.0 S	1 0.6	-
High school degree	64 13.3	39 10.7	9 32.1 B	15 17.2	26 8.9	38 20.3 E	15 12.7	29 16.7	20 11.0	40 13.2 L	7 8.0	1 2.9	18 13.6	16 9.9	30 17.8 N	64 26.8	-	49 24.6 ST	10 6.2	3 3.4
Technical/trade school program	37 7.7	27 7.4	5 17.9	5 5.7	20 6.8	17 9.1	9 7.6	14 8.0	14 7.7	30 9.9 L	6 6.8	1 2.9	6 4.5	17 10.6 M	14 8.3	37 15.5	-	20 10.1 T	14 8.6 T	3 3.4
Associates degree or some college	125 25.9	102 28.0 D	8 28.6	15 17.2	78 26.7	47 25.1	35 29.7	38 21.8	51 28.2	87 28.6 L	19 21.6	6 17.1	28 21.2	36 22.4	56 33.1 MN	125 52.3	-	61 30.7 T	41 25.3 T	13 14.6
Bachelor's degree	130 27.0	104 28.6 C	2 7.1	23 26.4 C	95 32.5 F	34 18.2	31 26.3	49 28.2	48 26.5	77 25.3	27 30.7	15 42.9 J	50 37.9 NO	42 26.1	35 20.7	-	130 55.1	37 18.6	51 31.5 R	37 41.6 R
Graduate / professional degree, e.g., J.D., MBA, MD, Ph.D.	106 22.0	76 20.9	3 10.7	27 31.0 BC	63 21.6	43 23.0	22 18.6	40 23.0	42 23.2	61 20.1	27 30.7 J	12 34.3 J	29 22.0	45 28.0 O	26 15.4	-	106 44.9	20 10.1	44 27.2 R	33 37.1 R
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	7 1.5	6 1.6	-	-	4 1.4	1 0.5	1 0.8	1 0.6	1 0.6	1 0.3	2 2.3	-	-	-	1 0.6	-	-	-	1 0.6	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd11 Page 95

DEC Free LED Detailed Participant Survey Results

What best describes your current employment status?

	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482 100.0	364 100.0	28 100.0	87 100.0	292 100.0	187 100.0	118 100.0	174 100.0	181 100.0	304 100.0	88 100.0	35 100.0	132 100.0	161 100.0	169 100.0	239 100.0	236 100.0	199 100.0	162 100.0	89 100.0
Employed full-time	306 63.5	231 63.5	12 C	62 71.3	182 62.3	124 66.3	63 53.4	109 62.6	131 72.4	202 66.4	57 64.8	20 57.1	111 84.1	130 80.7	57 33.7	130 54.4	176 74.6	96 48.2	127 78.4	67 75.3
Employed part-time	35 7.3	21 5.8	4 14.3	9 10.3	17 5.8	18 9.6	11 9.3	14 8.0	10 5.5	23 7.6	4 4.5	2 5.7	6 4.5	11 6.8	16 9.5	21 8.8	14 5.9	26 13.1	4 2.5	4 4.5
Retired	92 19.1	75 20.6	10 35.7	7 8.0	71 24.3	20 10.7	31 26.3	46 26.4	13 7.2	48 15.8	22 25.0	11 31.4	-	6 3.7	82 48.5	60 25.1	31 13.1	47 23.6	22 13.6	15 16.9
Not employed, but actively looking	15 3.1	11 3.0	-	4 4.6	6 2.1	9 4.8	4 3.4	3 1.7	8 4.4	9 3.0	2 2.3	1 2.9	4 3.0	5 3.1	6 3.6	8 3.3	7 3.0	11 5.5	2 1.2	2 2.2
Not employed, and not looking	27 5.6	21 5.8	1 3.6	5 5.7	12 4.1	15 8.0	8 6.8	1 0.6	18 9.9	20 6.6	2 2.3	1 2.9	11 8.3	9 5.6	7 4.1	20 8.4	7 3.0	19 9.5	7 4.3	1 1.1
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Missing response	7 1.5	5 1.4	1 3.6	-	4 1.4	1 0.5	1 0.8	1 0.6	1 0.6	2 0.7	1 1.1	-	-	-	1 0.6	-	1 0.4	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.

Appendix C. Detailed Survey Results

Table qd12 Page 96

DEC Free LED Detailed Participant Survey Results

Which category best represents your total annual pre-tax household income in <Last Whole Year>?

	Table 1: Housing Characteristics by Income Level																			
	Total	Housing Type			Housing Ownership Status		Number of Individuals in Residence			House Size (sqft)			Age			Education		Income		
		SF	Mobile	MF	Own	Rent	One	Two	Three +	<2,001	2,001-3,000	>3,000	<35	35-54	55+	<Coll	Coll+	<50K	50K-100K	100K+
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
Total	482	364	28	87	292	187	118	174	181	304	88	35	132	161	169	239	236	199	162	89
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
less than \$25,000	79	49	7	22	25	54	33	20	26	54	4	2	24	19	36	60	19	79	-	-
	16.4	13.5	25.0	25.3 B	8.6	28.9 E	28.0 HI	11.5	14.4	17.8 KL	4.5	5.7	18.2	11.8	21.3 N	25.1 Q	8.1	39.7	-	-
\$25,000 to just under \$50,000	120	79	15	26	60	59	33	44	42	89	8	2	40	34	44	82	38	120	-	-
	24.9	21.7	53.6 BD	29.9	20.5	31.6 E	28.0	25.3	23.2	29.3 KL	9.1	5.7	30.3 N	21.1	26.0	34.3 Q	16.1	60.3	-	-
\$50,000 to just under \$75,000	97	73	5	19	66	31	26	27	44	72	20	2	31	38	28	44	53	-	97	-
	20.1	20.1	17.9	21.8	22.6 F	16.6	22.0	15.5	24.3 H	23.7 L	22.7 L	5.7	23.5	23.6	16.6	18.4	22.5	-	59.9	-
\$75,000 to just under \$100,000	65	54	-	11	42	23	9	30	25	41	19	3	19	29	14	22	42	-	65	-
	13.5	14.8	-	12.6	14.4	12.3	7.6	17.2 G	13.8 G	13.5	21.6 JL	8.6	14.4	18.0 O	8.3	9.2	17.8 P	-	40.1	-
\$100,000 to just under \$150,000	50	48	-	2	42	8	8	25	17	21	16	12	14	12	22	13	37	-	-	50
	10.4	13.2 D	-	2.3	14.4 F	4.3	6.8	14.4 G	9.4	6.9	18.2 J	34.3 JK	10.6	7.5	13.0 N	5.4	15.7 P	-	-	56.2
\$150,000 or more	39	36	-	3	33	6	6	13	20	13	16	10	3	24	12	6	33	-	-	39
	8.1	9.9 D	-	3.4	11.3 F	3.2	5.1	7.5	11.0 G	4.3	18.2 J	28.6 J	2.3	14.9 MO	7.1 M	2.5	14.0 P	-	-	43.8
Don't know/Not sure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refused	2	2	-	-	1	1	-	2	-	1	-	-	-	-	2	2	-	-	-	-
	0.4	0.5	-	-	0.3	0.5	-	1.1	-	0.3	-	-	-	-	1.2	0.8	-	-	-	-
Missing response	30	23	1	4	23	5	3	13	7	13	5	4	1	5	11	10	14	-	-	-
	6.2	6.3	3.6	4.6	7.9 F	2.7	2.5	7.5 G	3.9	4.3	5.7	11.4	0.8	3.1	6.5 M	4.2	5.9	-	-	-

Comparison Groups: BCD/EF/GHI/JKL/MNO/PQ/RST  
T-Test for Means, Z-Test for Percentages  
Uppercase letters indicate significance at the 90% level.





## Appendix D. Participant Survey Instrument



Duke Energy Ohio & Duke Energy Carolinas  
DEC Free LED Program and DEO Residential LED Program  
Participant Survey  
FINAL  
February 14, 2017

### Background

The main goals of the survey are to estimate the first-year in-service rate, free-ridership and participant spillover. Additionally, this survey collects data to support an assessment of program processes.

We will administer the survey on a rolling basis online and via phone. We will offer participants monetary incentives in the form of cash prize drawings to further improve survey response rate.

### Introduction

#### [FOR INBOUND PHONE SURVEY]

Thank you for calling to complete the survey. My name is <NAME>. This survey is about the free LED bulbs you received from Duke Energy. We are trying to better understand your experience with the bulbs that Duke Energy provided, and your feedback will help Duke Energy better tailor its offerings. All of your responses are confidential.

#### [FOR WEB SURVEY]

Thank you for taking the time to complete this survey. This survey is about the free LED bulbs you received from Duke Energy. We are trying to better understand your experience with the bulbs that Duke Energy provided, and your feedback will help Duke Energy better tailor its offerings.

#### [FOR BOTH]

The survey will take about 10 minutes to complete. Your participation is very important, and as a token of appreciation, once you complete the survey, you will be entered into a drawing to win one of two \$100 Visa gift cards. You will be one of <COMPLETES> customers eligible to win.

#### [FOR INBOUND PHONE SURVEY]

For quality control purposes this call may be monitored or recorded.

## Screening

- I3. Are you the person who is most knowledgeable about the [IF DUP=0: free LED bulb kit] [IF DUP>0: free LED bulb kits] your household received from Duke Energy?
1. Yes
  2. No [FOR INBOUND PHONE SURVEY: ASK TO SPEAK WITH THE DECISION MAKER]

[ASK FOR INBOUND PHONE SURVEY]

- C1. Are you currently talking to me on a regular landline phone or a cell phone?
1. Regular landline phone
  2. Cell phone
  8. (Don't know)
  9. (Refused)

[ASK IF C1=2]

- CI2. Are you currently in a place where you can talk safely and answer my questions?
1. Yes
  2. No [SCHEDULE CALL BACK]
  8. (Don't know) [SCHEDULE CALL BACK]
  9. (Refused) [TERMINATE]

[ASK FOR WEB SURVEY ONLY]

[ASK IF I3=2]

- INT81. For the purposes of this survey, we are looking to gather feedback from the person most knowledgeable about the [IF DUP=0: free LED bulb kit] [IF DUP>0: free LED bulb kits] your household received from Duke Energy. Please have that person complete the survey using the same five-digit PIN that was provided in the survey invitation letter. [TERMINATE]

## Participation Verification

- IV1. [READ IF <MULTIORD>=1: Our records indicate that you have placed multiple orders for free LED bulbs. For the purposes of this survey, we will focus just on your most recent order.] Our records indicate that in <MONTH> of <YEAR>, you received [IF DUP=0: a free LED bulb kit] [IF DUP>0: free LED bulb kits] with <LED\_QTY> LED light bulbs from Duke Energy. Is that correct?
1. (Yes, both quantity and date are correct) [SHOW FOR WEB SURVEY]
  2. (No, quantity is correct but the date is wrong) [SHOW FOR WEB SURVEY]
  3. (No, date is correct, but quantity is wrong) [SHOW FOR WEB SURVEY]
  4. (No, both quantity and date are wrong) [SHOW FOR WEB SURVEY]
  5. (No, I did not receive any LEDs from Duke Energy) [TERMINATE]
  8. (Don't know) [TERMINATE]
  9. (Refused) [TERMINATE]

[ASK IF IV1=3,4]

- IV1B. How many LEDs did you receive from Duke Energy?
00. (Open-end, [ALLOW RESPONSES OF 1-97, SHOW FOR WEB SURVEY])
  98. (Don't know) [TERMINATE]
  99. (Refused) [TERMINATE]

[CALCULATE RECEIVED QUANTITY=IV1B IF IV1=3,4, ELSE=<LED\_QTY>]

[ASK IF IV1=2,4]

IV1C\_MO. When did you receive your LED kit(s)? [ [FOR WEB SURVEY: Please provide the month and the year.]

01. January
02. February
03. March
04. April
05. May
06. June
07. July
08. August
09. September
10. October
11. November
12. December
98. (Don't know)
99. (Refused)

IV1C\_YR. [FOR WEB: Please enter the year in which you received your free LED kit(s).] [RECORD YEAR; 9998=DK; 9999=REF]

#### Lighting Awareness and Purchase Behaviors

[ASK FOR INBOUND PHONE SURVEY ONLY]

Duke Energy is interested in learning more about the types of light bulbs that their customers use. I would like to learn about your experience with different types of light bulbs. After I describe each type of light bulb, please tell me if you have used or heard of this type light bulb before.

[ASK FOR INBOUND PHONE SURVEY ONLY]

B1P

- A. An incandescent bulb is a traditional light bulb that has been available for 100 years. Would you say you... (IF NEEDED: For many years, this was the most common household lightbulb. This bulb may also be known as the Edison bulb.)
1. Have used or currently use this type of light bulb
  2. Have heard of this type of light bulb but have never used it
  3. Have not heard of this type of light bulb before today
  8. (Don't know)
  9. (Refused)
- B. A halogen bulb looks similar to an incandescent light bulb. The exterior of a halogen bulb looks like an incandescent bulb but the interior contains a little capsule that produces the light.
1. Have used or currently use this type of light bulb
  2. Have heard of this type of light bulb but have never used it
  3. Have not heard of this type of light bulb before today
  8. (Don't know)
  9. (Refused)

C. CFLs, also known as compact fluorescent lamps, are commonly made with a glass tube bent into a spiral shape resembling soft-serve ice cream. Some CFLs may have a plastic or glass cover over the spiral tube.

1. Have used or currently use this type of light bulb
2. Have heard of this type of light bulb but have never used it
3. Have not heard of this type of light bulb before today
8. (Don't know)
9. (Refused)

B2P. The free light bulbs you received from Duke Energy are called LEDs. An LED bulb often has a plastic base, sometimes with ridges. LEDs are the newest type of light bulb on the market. **Prior to receiving** the free LEDs from Duke Energy, had you..?

1. Used this type of light bulb
2. Heard of this type of light bulb but had never used it
3. Or had you not heard of this type of light bulb
8. (Don't know)
9. (Refused)




[ASK FOR WEB SURVEY ONLY]

Duke Energy is interested in learning more about the types of light bulbs you used before you received your free LED bulb(s).

[ASK FOR WEB SURVEY ONLY]

B1W. Please indicate your level of experience with each type of light bulb shown below. For each product, please think about a bulb with a screw base similar to what you see in the pictures.

1. Have used this type of light bulb
2. Have heard of this type of light bulb but have never used it
3. Have not heard of this type of light bulb before today

Bulb Type	Description
<p>A. Incandescent</p> 	An incandescent bulb is a traditional light bulb that has been available for 100 years.
<p>B. Halogen</p> 	A halogen bulb looks similar to an incandescent light bulb. The exterior of a halogen bulb looks like an incandescent bulb but the interior contains a little capsule that produces the light.
<p>C. CFL (otherwise known as compact fluorescent lamp)</p> 	A CFL bulb, also known as a compact fluorescent lamp, is commonly made with a glass tube bent into a spiral shape resembling soft-serve ice cream. Some CFLs may have a plastic or glass cover over the spiral tube.

B2W. The free light bulbs you received from Duke Energy are called LEDs. An LED bulb often has a plastic base, sometimes with ridges. LEDs are the newest type of light bulb on the market. They may look like the following bulbs:



**Prior to receiving** the free LEDs from Duke Energy, have you..?

1. Used this type of light bulb
2. Heard of this type of light bulb but have never used it
3. Or have you not heard of this type of light bulb

[ASK IF B2P=1 OR B2W=1]

B3. Thinking about ALL of the light sockets in your home in which you could use a LED, how many of them contained LEDs **before** you received the free ones from Duke Energy?

1. All of them
2. Most of them
3. Some of them
4. A few of them
5. None of them
8. (Don't know)
9. (Refused)

### Installation Verification

IV2. Have you installed all, some, or none of the <RECEIVED QUANTITY> LED(s) you received from Duke Energy?

1. (All of them) [SHOW FOR WEB SURVEY]
2. (Some of them) [SHOW FOR WEB SURVEY]
3. (None of them) [SHOW FOR WEB SURVEY]
8. (Don't know)
9. (Refused)

[ASK IF IV2=2]

IV2A. How many of the <RECEIVED QUANTITY> LEDs that you had received from Duke Energy did you install? [NUMERIC OPEN END; 1 TO 97, 98=DON'T KNOW, 99=REFUSED]

[CALCULATE INSTALLED QUANTITY=RECEIVED QUANTITY IF IV2=1  
INSTALLED QUANTITY=IV2A IF IV2=2 AND IV2A<98  
INSTALLED QUANTITY=0 IF IV2=3, ELSE INSTALLED QUANTITY=MISSING]

[ASK IF INSTALLED\_QUANTITY>0]

IV3. Where did you install the bulb(s) that you received from Duke Energy? [FOR WEB: Please select all that apply.] [FOR PHONE: Did you install the bulb(s) in any of the following places?] [READ LIST]

1. On the inside of my home
2. On the outside of my home (please count garage as outside)
3. Someplace else

[ASK IF IV3=1,2]

IV3A. Does Duke Energy provide service at your home?

1. (Yes)
2. (No)
8. (Not sure) [SHOW FOR WEB SURVEY]

[ASK IF IV3=3]

IV3B. Where else did you install the bulb(s) that you received from Duke Energy? [MULTIPLE RESPONSE]

01. Where I work
02. In someone else's home
00. Some other place (specify\_\_\_\_\_)
98. (Don't know)
99. (Refused)

[ASK IF IV3=3]

IV3C. Does Duke Energy provide service at the other location(s) that you installed your bulb(s)?

01. (Yes)
02. (No)
00. Duke Energy provides service to some locations (please specify those locations below)
98. (Not sure) [SHOW FOR WEB SURVEY]

[ASK IF (IV2=2 OR IV2=3) AND RECEIVED\_QTY<>INSTALLED\_QTY, ELSE SKIP TO IV6]

IV4. [READ IF IV2=2] Why haven't you installed all of the free LEDs you received?

[READ IF IV2=3] "Why haven't you installed any of the free LEDs you received?"

[MULTIPLE RESPONSE UP TO 4, RANDOMIZE]

01. Haven't had the need to install bulbs
02. I am waiting for light bulbs to burn out
03. I don't have a light socket where I use that wattage
04. I don't like LEDs
00. (Other, specify) [SHOW FOR WEB SURVEY]
98. (Don't know)
99. (Refused)

IV5. What did you do with the LED(s) you did not install? [MULTIPLE RESPONSE UP TO 4, RANDOMIZE]

01. Placed them in storage for later use
02. Threw them away
03. Gave them away
00. (Other, specify) [SHOW FOR WEB SURVEY]
98. (Don't know)
99. (Refused)

[ASK IF IV2=1 OR IV2=2]

IV6. [READ IF INSTALLED QUANTITY=1] Have you removed the free LED that you installed?

[READ IF INSTALLED QUANTITY>1] Have you removed any of the free LEDs that you installed?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF IV6=1 AND INSTALLED QUANTITY>1]

IV6A. How many of the <INSTALLED QUANTITY> LEDs have you removed? [NUMERIC OPEN END; 1 TO 97, 98=DON'T KNOW, 99=REFUSED, RESPONSE MUST BE LESS THAN INSTALLED QUANTITY]

[ASK IF IV6=1 AND INSTALLED QUANTITY=1]

IV7aa. Was the free LED that you removed working or was it broken?

1. Working
2. Broken
- 8 (Don't know)
9. (Refused)

[ASK IF IV6=1 AND INSTALLED QUANTITY>1]

IV7ab. Were the free LEDs that you removed working or were they broken?

1. All were working
2. All were broken
3. Some were working and some were broken
- 8 (Don't know)
9. (Refused)

[ASK IF IV7AA=1 OR IV7AB=1 OR 3]

IV7b. What did you do with the **working** LED(s) you removed? [MULTIPLE RESPONSE UP TO 5, RANDOMIZE]

01. Placed them in storage for later use
02. Threw them away
03. Gave them away
04. Installed them somewhere besides my home
05. Installed elsewhere in my home
00. (Other, specify) [SHOW FOR WEB SURVEY]
98. (Don't know)
99. (Refused)

[ASK IF IV6=1]

IV8. [SHOW FOR WEB SURVEY: It looks like you removed some of the bulbs that you ordered from the Duke Energy Free LED program.] Why did you remove the bulbs? [RANDOMIZE] [READ LIST]

01. Do not like light quality/not bright enough/too bright
02. Do not like appearance of bulb
03. Bulbs stopped working/burned out
04. Bulbs never worked
00. Other, specify
98. (Don't know)
99. (Refused)

## Replacement Behaviors

[ASK IF INSTALLED QUANTITY>0 AND B1PC=1 OR B1WC=1 OR B2P=1 OR B2W=1]

R1. [ASK FOR INBOUND PHONE: I am] [ASK FOR WEB: We are] interested in the types of bulbs that were in the sockets before you installed the free LEDs in them. Did you have any CFLs or LEDs in any of those sockets?

(READ IF NEEDED FOR INBOUND PHONE SURVEY: CFLs are “twisty” bulbs that are made with a glass tube bent into a spiral, resembling self-serve ice-cream. Very often they look just like the bulbs that were installed through the program.

An LED bulb often has a plastic base, sometimes with ridges. LEDs are the newest type of light bulb on the market. They typically cost more than the other types of light bulbs.)

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF R1=1]

R2. How many of the <INSTALLED QUANTITY> sockets where you installed the free LEDs had CFLs or LEDs in them? [NUMERIC OPEN END 1-<INSTALLED QUANTITY>, 98=DON'T KNOW; 99=REFUSED]

[ASK IF INSTALLED QUANTITY>0, ELSE SKIP TO NEXT SECTION]

[SKIP IF R2=INSTALLED QUANTITY]

R3. Were any of the sockets where you installed the free LEDs empty at the time you installed the free LEDs in them?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF R3=1]

R3A. How many of the sockets where you installed the free LEDs were empty? [NUMERIC OPEN END 1-<INSTALLED QUANTITY>, 98=DON'T KNOW; 99=REFUSED]

R4. At the time that you installed the free LED(s), were any of the bulbs you replaced with free LEDs still working or had all of them burnt out? [RANDOMIZE]

1. All were still working
2. Some were still working
3. All of them had burnt out
8. (Don't know)
9. (Refused)



## Free Ridership

For this next set of questions, please think about **all** <RECEIVED QUANTITY> of the LEDs that you received for free from Duke Energy.

- FR1. When you purchase light bulbs, do you generally purchase the lowest priced bulb, or do you consider other factors, such as energy efficiency, quality of light, or longevity of the bulb a factor in your decision? (IF PARTICIPANT SAYS THAT THEY CONSIDER BOTH PRICE AND OTHER FACTORS, RECORD RESPONSE AS 2)
1. I purchase the lowest-priced bulb
  2. I consider other factors
  8. (Don't know)
  9. (Refused)

[CALCULATE LEDKITCOST=LEDBULBCOST \* RECEIVED QUANTITY]

- FR2. The <RECEIVED QUANTITY> LED bulbs you received from Duke Energy cost about \$<LEDBULBCOST> per bulb at a retail store, for a total cost of \$<LEDKITCOST>.

If you had not received the <RECEIVED QUANTITY> LEDs from Duke Energy, what would you have purchased the next time you needed to buy light bulbs? [RANDOMIZE]

1. Incandescent or halogen bulbs
2. CFLs
3. LEDs
4. A mix of bulbs
5. The lowest cost bulbs
8. (Don't know)
9. (Refused)

[ASK IF FR2=2]

- FR3. Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would you have still purchased CFLs, or would you have purchased a different type of light bulb?
1. Still would have purchased CFLs [SKIP TO FR10]
  2. Would have purchased a different type of light bulb [RETURN TO FR2, DO NOT GIVE CFLs AS AN OPTION IN FR2]
  8. (Don't know) [SKIP TO FR10]
  9. (Refused) [SKIP TO FR10]

[ASK IF FR2=3]

- FR4. Would you have purchased all <RECEIVED QUANTITY> LEDs or just some at full retail price of \$<LEDBULBCOST> per bulb?
1. All of them
  2. Some of them
  3. (None of them)
  8. (Don't know)
  9. (Refused)

[ASK IF FR4=2]

FR5. How many of the <RECEIVED QUANTITY> LEDs would you have purchased at the full retail price of \$<LEDBULBCOST> per bulb? [NUMERIC OPEN END, 1 TO <RECEIVED QUANTITY>, 98=DON'T KNOW; 99=REFUSED]

[CALCULATE FR\_QTY=FR5 IF FR4=2 OR FR\_QTY=RECEIVED QUANTITY IF FR4=1]  
[CALCULATE PROG\_QTY=RECEIVED QUANTITY - FR\_QTY]

[ASK IF FR4=2 AND FR5<98 AND PROG\_QTY>0]

FR6. Just to make sure I recorded everything accurately, you are telling me that of the <RECEIVED QUANTITY> LEDs that you received from Duke Energy, you would have purchased <FR5 ANSWER> LEDs, which means that you would not have purchased <RECEIVED QUANTITY-FR5 ANSWER>. Is that correct?

1. Yes
2. No [RETURN TO FR5]
8. (Don't know)
9. (Refused)

[ASK IF FR4=2 AND FR5<98 AND PROG\_QTY>0]

FR7. For these <RECEIVED QUANTITY-FR5 ANSWER> bulbs, would you have still purchased LEDs but have done it later, or would you have purchased a different type of light bulb instead of LEDs?

1. Purchased LEDs later
2. Purchased a different type of light bulb
8. (Don't know)
9. (Refused)

[ASK IF FR7=2]

FR7A. What type(s) of light bulbs would you have purchased instead of LEDs? [MULTIPLE RESPONSE]

1. Incandescent or halogen bulbs
2. CFLs
4. (Other)
8. (Don't know)
9. (Refused)

[ASK IF FR7A=2]

FR7B. Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would CFLs still have been a part of the mix?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF FR7B=2, GO BACK TO FR7A AND RECORD UPDATED RESPONSES]

[ASK IF FR2=4]

FR8. What types of bulbs would likely have been in the mix? [MULTIPLE RESPONSE]

1. Incandescent or halogen bulbs
2. CFLs
3. LEDs
00. (Other: Specify)
8. (Don't know)
9. (Refused)

[ASK IF FR8=2]

FR9. Similar CFL bulbs cost about \$<CFLBULBCOST> per bulb at a retail store. Knowing this, would CFLs still have been a part of the mix?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[IF FR9=2, GO BACK TO FR8 AND RECORD UPDATED RESPONSES]

[ASK IF R4=1 OR R4=2 AND FR2<>1 AND 5]

FR10. Earlier, you indicated that you replaced working light bulbs with the LEDs you received for free from Duke Energy. If you had not received the free LEDs from Duke Energy, would you have still replaced these working light bulbs with LEDs, or would you have waited until they burnt out?

1. Would have replaced working bulbs with LEDs
2. Would have waited until working bulbs had burnt out
8. (Don't know)
9. (Refused)

**Spillover**

S01. Besides the free LEDs you received from Duke Energy, have you or anyone in your household purchased light bulbs in the past year?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF S01=1; ELSE SKIP TO MI1]

S02. Did you purchase these light bulbs before or after you received the free LEDs from Duke Energy?

1. (Before receiving the free LEDs from Duke Energy) [SHOW FOR WEB SURVEY]
2. (After receiving the free LEDs from Duke Energy) [SHOW FOR WEB SURVEY]
3. (Both before and after receiving the free LEDs from Duke Energy) [SHOW FOR WEB SURVEY]
8. (Don't know)
9. (Refused)

S03. What types of light bulbs did you purchase in the past year? [MULTIPLE RESPONSE UP TO 5]

- 01. Incandescent or halogen bulbs
- 03. CFL bulbs
- 04. LED bulbs
- 00. (Other, specify) [SHOW FOR WEB SURVEY]
- 98. (Don't know)
- 99. (Refused)

[ASK IF S02=2 OR 3 AND S03=3 OR 4, ELSE SKIP TO MI1]

S04. Approximately how many CFLs or LEDs did you purchase **after** you received the free LEDs from Duke Energy?

[NUMERIC OPEN END; 0-997, 998=DON'T KNOW, 999=REFUSED]

[ASK IF S04>0]

S05. Did your experience with the **free** LEDs you received from Duke Energy encourage you IN ANY WAY to purchase the additional CFLs or LEDs?

- 1. Yes
- 2. No
- 8. (Don't know)
- 9. (Refused)

[ASK IF S05=1]

S06. How influential was your experience with the free LEDs you received from Duke Energy on your decision to purchase the additional CFLs or LEDs? [CATI ONLY:] Please answer using a scale of 0 to 10, where 0 is "not at all influential" and 10 is "very influential",

[SCALE 0-10, 98=DON'T KNOW, 99=REFUSED]

[ASK IF S06>6]

S07. How, specifically, did receiving the free LEDs from Duke Energy influence your decision to purchase the additional CFLs or LEDs?

[OPEN END, 98=DON'T KNOW, 99=REFUSED]

### Program Marketing and Interactions

MI1. How did you first learn you could receive free LEDs from Duke Energy? [READ LIST] [RANDOMIZE]

- 01. Duke Energy mailing or letter
- 02. Bill insert
- 03. Duke Energy website
- 04. Family, friends, word of mouth
- 05. Direct email about the program
- 00. Or some other way? (Please specify)
- 98. (Don't know)
- 99. (Refused)

MI2. Have you ever logged into your online residential account with Duke Energy?

1. Yes
2. No
8. (Don't know) [\[SHOW FOR WEB SURVEY\]](#)
9. (Refused)

[\[ASK IF MI2=1\]](#)

MI3. Have you ever received a notification that free LEDs were available while you were logged into your online account?

1. Yes
2. No
8. (Don't know) [\[SHOW FOR WEB SURVEY\]](#)
9. (Refused)

[\[ASK IF MI3=1\]](#)

MI4. Did you request free LEDs as a result of this notification?

1. Yes
2. No
8. (Don't know) [\[SHOW FOR WEB SURVEY\]](#)
9. (Refused)

MI5. Before ordering your LEDs, did you receive any materials from Duke Energy about the cost savings on your energy bill from installing more energy efficient lighting?

1. Yes
2. No
8. (Don't know) [\[SHOW FOR WEB SURVEY\]](#)
9. (Refused)

[\[ASK IF MI5=1\]](#)

MI6. Did you request the free LEDs from Duke Energy as a result of what you learned from these materials?

1. Yes
2. No
8. (Don't know) [\[SHOW FOR WEB SURVEY\]](#)
9. (Refused)

MI7. Besides providing you free LEDs to use in your home, are you aware of any offerings from Duke Energy that can help you save energy in your home?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF MI7=1]

MI8. What offerings were you aware of? [READ LIST] [MULTIPLE RESPONSE, RANDOMIZE]

01. Duke Energy online CFL/LED store
02. Home Energy Call/Home Energy Assessment
03. Power Manager Program
04. Appliance Recycling Program
05. Online Home Energy Report
00. Other, specify
98. (Don't know)
99. (Refused)

[ASK IF MI7=1]

MI10. When did you find out about these offerings?

1. Before ordering free LED(s)
2. After ordering free LED(s)

[SHOW ANSWER OPTION 3 IF MORE THAN ONE RESPONSE TO MI8]

3. Found out about some programs before and some programs after ordering LED(s)
8. (Don't know)
9. (Refused)

[ASK IF MI7=1]

MI11. Did you participate in any of these offerings?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF MI11=1] [MULTIPLE RESPONSE UP TO 6] [READ ONLY RESPONSES SELECTED IN MI8]

MI12. In which offering(s) did you participate?

01. Duke Energy online CFL/LED store
02. Home Energy Call/Home Energy Assessment
03. Power Manager Program
04. Appliance Recycling Program
05. Online Home Energy Report
06. <OPEN END FROM MI8>
00. (Other, specify)
98. (Don't know)
99. (Refused)

[SKIP IF MI8=1]

MI13. Prior to taking this survey, were you aware that Duke Energy has an online store where customers can purchase LED bulbs at discounted prices?

1. Yes
2. No
8. (Don't know)
9. (Refused)

## Residential Program Satisfaction

I'd like to ask you a few questions about your experience receiving free LEDs from Duke Energy.

- S1. From the time you requested free LEDs from Duke Energy, approximately how long did it take for you to receive your bulbs in the mail?
01. 1 week
  02. 2 weeks
  03. 3 weeks
  04. 4 weeks (a month)
  05. 5 weeks
  06. 6 weeks
  07. 7 weeks
  08. 8 weeks (2 months)
  09. More than 8 weeks
  98. Cannot remember how long it took

- S2. How satisfied were you with how long it took to receive the free LEDs? [FOR INBOUND PHONEY SURVEY: Please answer on a scale of 0 to 10, where 0 means "extremely dissatisfied" and 10 means "extremely satisfied."] [SCALE 0-10, 98=DON'T KNOW, 99=REFUSED]

- S3. After you received your free LEDs from Duke Energy, how often did you contact Duke Energy or program staff with questions?
1. Never
  2. Once
  3. 2 or 3 times
  4. 4 times or more
  8. (Don't know)
  9. (Refused)

[ASK IF S3=2,3,4]

- S4. How did you contact them? [MULTIPLE RESPONSES]
1. Phone
  2. Email or fax
  3. Letter
  4. In person
  8. (Don't know)
  9. (Refused)

[ASK IF S3=2,3,4]

- S4A. Why did you contact Duke Energy? [MULTIPLE RESPONSES] [ROTATE]
1. Bulbs were broken
  2. Didn't like the light bulbs I received
  3. I received the wrong bulbs
  0. (Other, please specify) [OPEN-ENDED RESPONSE, SHOW FOR WEB SURVEY]
  8. (Don't know)
  9. (Refused)

[ASK IF S3=2,3,4]

- S5. And how satisfied were you with your communications with Duke Energy and program staff? [FOR INBOUND PHONE SURVEY: Please answer on a scale of 0 to 10, where 0 means "extremely dissatisfied" and 10 means "extremely satisfied."]  
[SCALE 0-10, 98=DON'T KNOW, 99=REFUSED]

[ASK IF S5<5]

- S6. Why were you dissatisfied?  
[OPEN-ENDED RESPONSE 98=DON'T KNOW, 99=REFUSED]

[ASK IF FINAL INSTALLED QUANTITY>0]

- S7. Have you noticed any savings on your electric bill since installing your free LED(s)?
1. Yes
  2. No
  8. (Don't know)
  9. (Refused)

[ASK IF S7=1]

- S8. How satisfied are you with any savings you noticed on your electric bill since installing your free LEDs? [FOR INBOUND PHONE SURVEY: Please answer on a scale of 0 to 10, where 0 means "extremely dissatisfied" and 10 means "extremely satisfied."]  
[SCALE 0-10, 96="I DIDN'T NOTICE ANY SAVINGS," 98=DON'T KNOW, 99=REFUSED]
- S9. How satisfied are you with your new free LEDs? [FOR INBOUND PHONE SURVEY: Please answer on a scale of 0 to 10, where 0 means "extremely dissatisfied" and 10 means "extremely satisfied."]  
[SCALE 0-10, 98=DON'T KNOW, 99=REFUSED]

[ASK IF S9<5]

- S10. Why aren't you satisfied?
00. [OPEN END]
  98. (Don't know)
  99. (Refused)

- S11. Finally, how satisfied with your experience receiving free LEDs from Duke Energy are you overall? [FOR INBOUND PHONE SURVEY: Please answer on a scale of 0 to 10, where 0 means "extremely dissatisfied" and 10 means "extremely satisfied."]  
[SCALE 0-10, 98=DON'T KNOW, 99=REFUSED]

[ASK IF S11<>98, 99]

- S12. Do you have any suggestions to improve Duke Energy's free LED offering?
00. (Open end, specify) [SHOW FOR WEB SURVEY]
  96. (No suggestions/None) [SHOW FOR WEB SURVEY]
  98. (Don't know)
  99. (Refused)



- S13. Based on your overall experience with Duke Energy's service, how satisfied are you with having them as your electric company? [\[FOR INBOUND PHONE SURVEY: Please answer on a scale of 0 to 10, where 0 means "extremely dissatisfied" and 10 means "extremely satisfied."\]](#)  
[\[SCALE 0-10, 98=DON'T KNOW, 99=REFUSED\]](#)

[\[ASK IF S13<5\]](#)

- S14. Why did you rate it that way? [\[OPEN END\]](#)

## Demographics

These last few questions are about your home and your household.

- D1. Which of the following best describes your home/residence?
01. Single-family detached home (If needed: Not a duplex, townhome, or apartment; attached garage is OK)
  02. Single family attached home (If needed: townhouse)
  03. Mobile home
  04. Apartment or condominium (If needed: multifamily)
  00. (Other, specify) [\[SHOW FOR WEB SURVEY\]](#)
  98. (Don't know)
  99. (Refused)

[\[ASK IF D1=1\]](#)

- D1a. Is your home a factory manufactured or modular home?
1. (Yes, factory manufactured or modular) [\[SHOW FOR WEB SURVEY\]](#)
  2. (No, conventionally built) [\[SHOW FOR WEB SURVEY\]](#)
  8. (Don't know)
  9. (Refused)

[\[ASK IF D1=4\]](#)

- D1b. How many housing units (If needed: apartments) are in your building? (READ RESPONSES IF NECESSARY)
1. (1) (Interviewer note: Do not read even if other responses are read) [\[SHOW FOR WEB SURVEY\]](#)
  2. (2-3) [\[SHOW FOR WEB SURVEY\]](#)
  3. (4-9) [\[SHOW FOR WEB SURVEY\]](#)
  4. (10 or more) [\[SHOW FOR WEB SURVEY\]](#)
  8. (Don't know) [\[SHOW FOR WEB SURVEY\]](#)
  9. (Refused)
- D2. Do you own or rent this residence?
1. (Own) [\[SHOW FOR WEB SURVEY\]](#)
  2. (Rent) [\[SHOW FOR WEB SURVEY\]](#)
  8. (Don't know)
  9. (Refused)

[ASK IF D2=2]

D2a. Do you pay your own electric bill or is it included in your rent?

1. (Pay bill) [SHOW FOR WEB SURVEY]
2. (Included in rent) [SHOW FOR WEB SURVEY]
8. (Don't know)
9. (Refused)

D3. How long have you lived in this residence? (READ RESPONSES IF NECESSARY)

1. (Less than 1 year) [SHOW FOR WEB SURVEY]
2. (1-3 years) [SHOW FOR WEB SURVEY]
3. (4-10 years) [SHOW FOR WEB SURVEY]
4. (11-20 years) [SHOW FOR WEB SURVEY]
5. (More than 20 years) [SHOW FOR WEB SURVEY]
8. (Don't know)
9. (Refused)

D4. Including yourself, how many people currently live in your residence year-round?

[NUMERIC OPEN END 0-97, 98=DON'T KNOW, 99=REFUSED]

[SKIP IF D4=1]

D5. How many people under the age of 18 live in your residence?

[NUMERIC OPEN END 0-97, 98=DON'T KNOW, 99=REFUSED]

D6. Approximately when was your residence first built?

01. (Before 1950) [SHOW FOR WEB SURVEY]
02. (1950-1959) [SHOW FOR WEB SURVEY]
03. (1960-1969) [SHOW FOR WEB SURVEY]
04. (1970-1979) [SHOW FOR WEB SURVEY]
05. (1980-1989) [SHOW FOR WEB SURVEY]
06. (1990-1999) [SHOW FOR WEB SURVEY]
07. (2000-2005) [SHOW FOR WEB SURVEY]
08. (2006-2009) [SHOW FOR WEB SURVEY]
09. (2010 or later) [SHOW FOR WEB SURVEY]
98. (Don't know) [SHOW FOR WEB SURVEY]
99. (Refused)

D7. Approximately how many square feet is your residence?

[NUMERIC OPEN END 1-50000; 99998=DON'T KNOW[SHOW FOR WEB SURVEY], 99999=REFUSED]

[ASK IF D7=99998]

D8. Would you estimate the square footage of your residence to be:

1. Less than 1,000 sq. ft.
2. Between 1,001 and 2,000 sq. ft.
3. Between 2,001 and 3,000 sq. ft.
4. Between 3,001 and 4,000 sq. ft.
5. Between 4,001 and 5,000 sq. ft.
6. Greater than 5,000 sq. ft.
8. (Don't know) [SHOW FOR WEB SURVEY]
9. (Refused)

- D9. In what year were you born? [NUMERIC OPEN END 1900-2015, 9998=DON'T KNOW, 9999=REFUSED]
- D10. What is your highest level of education?
1. Less than a high school degree
  2. High school degree
  3. Technical/trade school program
  4. Associates degree or some college
  5. Bachelor's degree
  6. Graduate / professional degree, e.g., J.D., MBA, MD, Ph.D.
  8. (Don't know)
  9. (Refused)
- D11. What best describes your current employment status?
1. Employed full-time
  2. Employed part-time
  3. Retired
  4. Not employed, but actively looking
  5. Not employed, and not looking
  8. (Don't know)
  9. (Refused)
- D12. [FOR INBOUND PHONE SURVEY: Please stop me when I reach the category that best represents your total annual pre-tax household income in <last whole year, i.e., 2015>.]
- [FOR WEB SURVEY: Which category best represents your total annual pre-tax household income in <last whole year, i.e., 2015>?]
1. Less than \$25,000
  2. \$25,000 to just under \$50,000
  3. \$50,000 to just under \$75,000
  4. \$75,000 to just under \$100,000
  5. \$100,000 to just under \$150,000
  6. \$150,000 or more
  8. (Don't know)
  9. (Refused)
- D13. Thank you for completing our survey! Your name will be entered into our drawing for two \$100 cash prizes. [FOR INBOUND PHONE SURVEY: What would be the best phone number and email address to reach you at if you win the drawing?] [FOR WEB SURVEY: Please enter the phone number and email address to contact you at if you win the drawing.]
- A. Phone: [OPEN-END NUMERIC REQUIRING 10 DIGITS]
  - B. Email: [OPEN-END]

*Those are all the questions I have. Thank you so much for your participation!*

## Appendix E. Detailed Overview of the Net-to-Gross Algorithm

This appendix contains a detailed overview of the free ridership (FR) and spillover algorithms.

### Free Ridership Algorithm

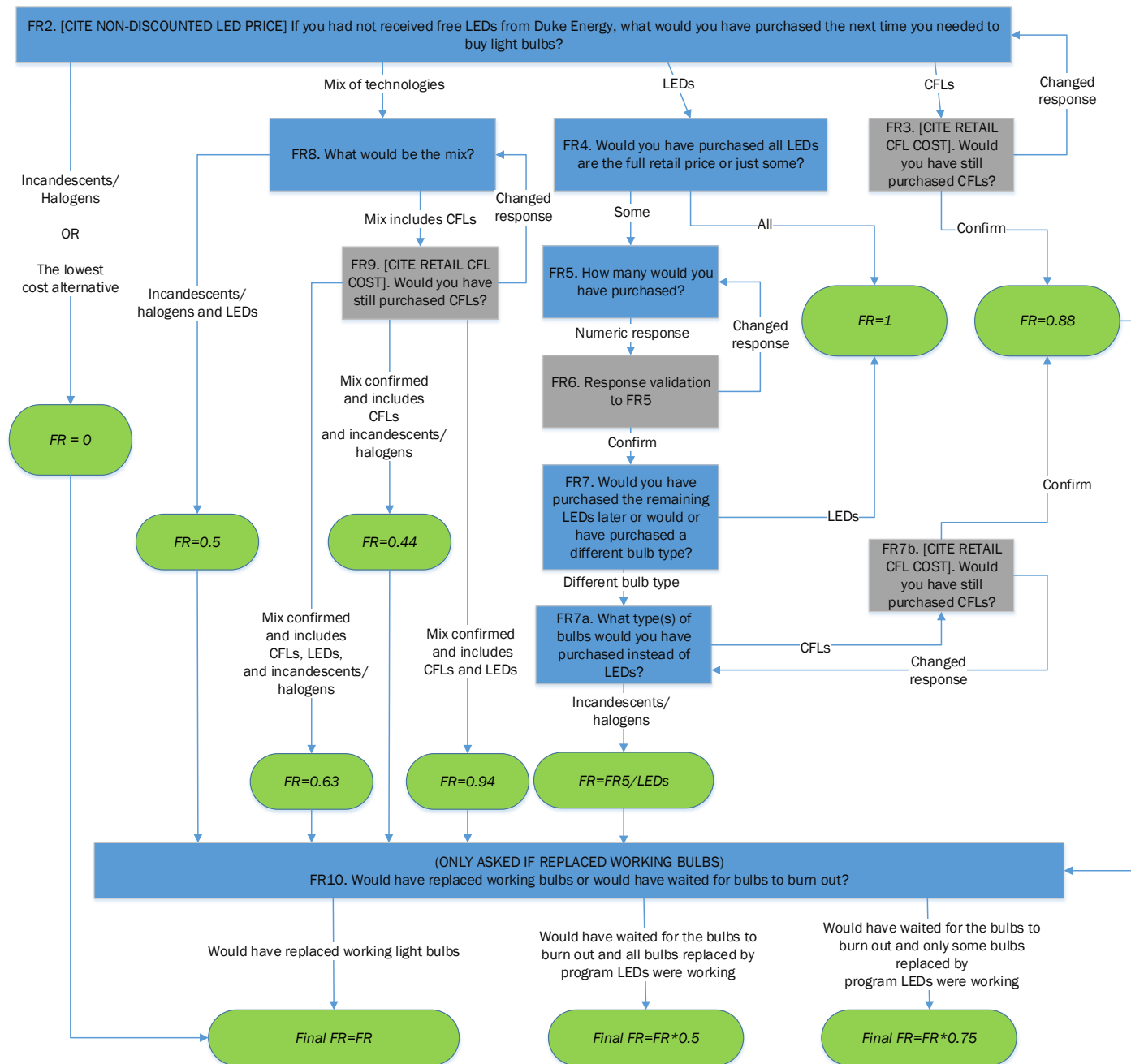
Participants of the Free LED program received free LED kits via mail. As such, we asked participants questions about their purchase behaviors and decisions **in the absence** of the free LED kit offering. Figure E-1 provides a detailed overview of the FR algorithm. Blue boxes in the graphic are questions used in the calculation of the FR score, grey boxes are validation and consistency check questions and green boxes are FR calculations.

We first asked participants what they would have purchased the next time they needed light bulbs if they had not received their free LED kit. We included retail LED pricing as part of the question to make sure that participants provide responses with consideration of the LED costs. Participants who said they would have purchased incandescents, halogens, or the lowest cost light bulb option, were classified as non-free-riders. Participants who said they would have purchased LEDs received follow-up questions asking about the timing and the quantity of the counterfactual LED purchase. Participants who reported purchasing CFLs in the absence of the program, received a follow-up question validating their response. As part of the question, we provided retail prices for CFLs and asked participants to confirm their counterfactual product choice. Participants who reported purchasing a mix of products in the absence of the program received follow-up questions exploring the mix and validating respondent choices of the products in the mix.

As part of the FR algorithm we accounted for the differences in efficiency between CFLs and LEDs. In cases where participants would have purchased CFLs in the absence of the program, we adjusted the FR downward to give the program the credit for increasing the efficiency as compared to the counterfactual choice. We developed an adjustment rate based on the differences in delta watts between LEDs and CFLs and applied it to all instances of counterfactual CFL purchases, scaling it as needed, depending on the counterfactual product mix.

Finally, as part of the FR algorithm, we explored participant installation patterns of program LEDs and give the program additional credit in cases where it motivated customers to replace **working** less efficient products instead of waiting for those bulbs to burn out. By encouraging participants to replace working light bulbs, the program accelerates energy savings and therefore deserves a credit. In cases where participants said that in the absence of the program they would have waited for their bulbs to burn out, we gave the program the credit depending on the number of **working** light bulbs that program LEDs replaced.

Figure E-1. Free LED Program Free-Ridership Algorithm



As part of calculating the FR, we made reasonable imputations where participant responses were missing or contradictory. For instance, in cases where respondents reported that they would have purchased LEDs in the absence of the program, yet earlier in the survey they reported that they had not heard of LEDs prior to the survey, we reset participant FR to zero (non-free riders).

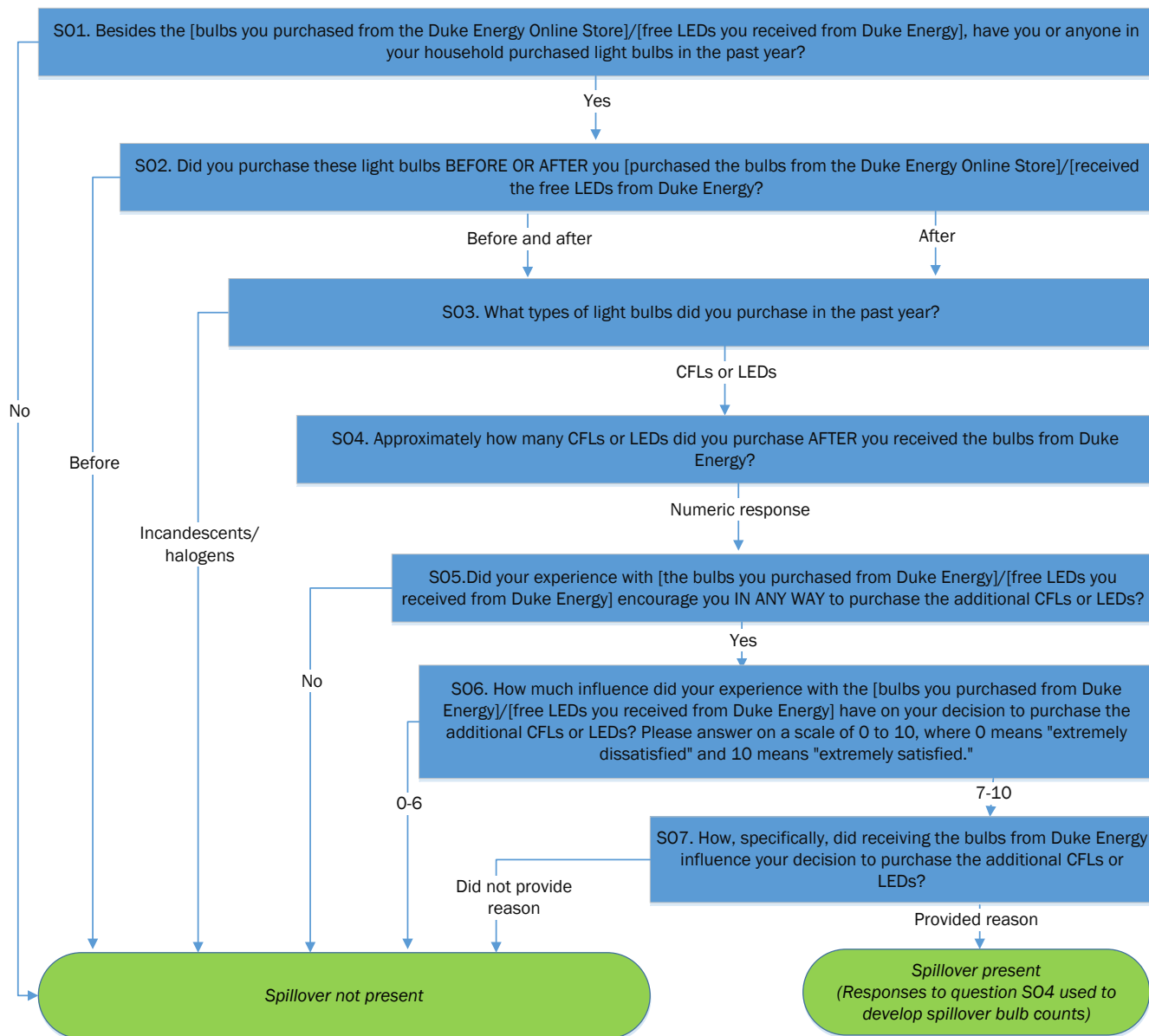
Using the above-outlined algorithm, we calculated a FR rate for each respondent. We aggregated respondent results to the program level by weighting individual participant responses by the energy savings associated with the technology purchased.

### Spillover Algorithm

We limited the exploration of spillover effects to lighting products. Exploration of the presence and magnitude of spillover from other end uses would require a much longer survey. Given the nature of the Free LED program, the Evaluation Team does not believe that spillover effects from other end uses are likely enough to justify the additional respondent burden.

We explored non-program CFL and LED purchases and the degree of program influence on those purchases through the participant survey. Participants were asked whether they purchased any CFLs or LEDs after receiving program discounted CFLs and/or LEDs from the program and, if so, how many additional bulbs they had purchased. We did not ask participants to report bulb wattages because customers typically have difficulty recalling wattage information, especially if they purchased bulbs across a range of wattages. Due to survey length, we also did not ask questions about bulb type (standard or specialty). Respondents who reported purchasing additional products received follow-up questions about the impact of the program on their purchase of the energy efficient products. Respondents who reported that the program influenced their decision were asked to provide a quantitative rating of the level of program influence as well as a qualitative explanation of the way(s) the program influenced their purchase decisions. Figure E-2 graphically depicts the spillover algorithm we will deploy as part of the participant surveys to establish the presence of participant spillover and obtain the total number of spillover bulbs.

Figure E-2. Spillover Algorithm



Equation E-1 shows the formula that we used to estimate SO energy savings, and Equation E-2 shows the formula that we used to estimate SO peak demand savings.

Equation E-1. SO Energy Savings Formula

$$\Delta kWh = \frac{(Watts * HOU)_{base} - (Watts * HOU)_{ee}}{1,000} * 365 * (1 + HVAC_c)$$

### Equation E-2. SO Peak Demand Savings Formula

$$\Delta kW = \frac{Watts_{base} - Watts_{ee}}{1,000} * CF * (1 + HVAC_d)$$

Where:

- $\Delta kWh$  = first-year electric energy savings
- $\Delta kW$  = peak electric demand savings
- $Watts_{base}$  = Baseline wattage
- $Watts_{ee}$  = Efficient bulb wattage
- $HOU$  = residential annual operating hours
- $CF$  = peak coincidence factor
- $HVAC_c$  = HVAC system interaction factor for energy
- $HVAC_d$  = HVAC system interaction factor for demand

Table E-1 shows the savings assumptions that we used to estimate SO energy and demand savings and details the sources of those assumptions. We assumed that SO bulbs were standard bulbs and assumed an efficient wattage of 13 watts for CFLs and 9 watts for LEDs. These wattages represent typical wattages of the standard CFL and LED. We used the EISA-adjusted baseline wattages for 60-watt incandescent equivalents. All other savings assumptions mirror the ones we used to estimate energy and demand savings for program LEDs.

Table E-1. SO Savings Assumptions

Assumption Type	Assumption Value	Assumption Source
Efficient bulb wattage – CFL	13	Typical standard CFL wattage
Efficient bulb wattage – LED	9	Actual program LED wattage
Baseline wattage	43	2017 DEC Shelf Audit
HOU – LED	2.88 hours/day	2017 DEC/DEP Residential Lighting Hours of Use Study
Summer CF – LED	0.128	
Winter CF – LED	0.145	
HOU – CFL	2.92 hours/day	2012 DEP EEL Program Evaluation
Summer CF – CFL	0.114	
Winter CF – CFL	0.096	
HVAC <sub>c</sub>	–0.037	2012 DEC Smart \$aver Program Evaluation
HVAC <sub>d</sub> – Summer	0.168	
HVAC <sub>d</sub> – Winter	–0.500	2012 DEP EEL Program Evaluation

Using the savings formula and the savings assumptions above, we estimated per-bulb kWh savings of 34.42 for LEDs and 30.79 for CFLs. We then multiplied the per-bulb savings by the total quantity of SO CFLs and LEDs. Overall, the program achieved SO savings of 2,949 kWh, 0.4339 summer peak kW, and 0.2089 winter peak kW.



Table E-2. SO Savings Summary

Product Type	Total Number of SO Bulbs	Total Per-Bulb Savings			Total SO Savings		
		kWh	Summer Peak kW	Winter Peak kW	kWh	Summer Peak kW	Winter Peak kW
CFLs	3	30.79	0.0040	0.0014	92	0.0120	0.0043
LEDs	83	34.42	0.0051	0.0025	2,857	0.4219	0.2046
<b>Total</b>	<b>86</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2,949</b>	<b>0.4339</b>	<b>0.2089</b>

Note that the values have been rounded.

We estimated the program SO rate by dividing the SO savings by the ex post gross savings for the survey respondents who received SO questions.

Equation E-3. SO Rate Formula

$$\text{Spillover Rate} = \frac{\text{Spillover Savings}}{\text{Evaluated Gross Savings in the Respondent Sample}}$$

The resulting SO rate is 1.4% (Table E-3).

Table E-3. SO Rate Estimate

	kWh	Summer Peak kW	Winter Peak kW
SO savings	2,949	0.4339	0.2089
Ex post gross savings in the respondent sample	213,400	31.5	15.1
SO rate	1.4%	1.4%	1.4%

Note that the values have been rounded.

## Appendix F. Participant Survey Data Package

We provide the final participant survey data package as a separate submission. As part of the package, we provide final participant survey data file in Stata and Excel as well as a data dictionary.

## Appendix G. In-Service Rate, Free-Ridership, and Spillover Calculations

The Stata syntax code is provided as a separate submission and contains detailed calculations of the program's first-year in-service rate, free-ridership, and spillover.

**For more information, please contact:**

**Kessie Avseikova**  
**Director**

617 492 1400 tel  
617 497 7944 fax  
kavseikova@opiniondynamics.com

1000 Winter St  
Waltham, MA 02451



**Boston | Headquarters**

617 492 1400 tel  
617 497 7944 fax  
800 966 1254 toll free

1000 Winter St  
Waltham, MA 02451

**San Francisco Bay**

510 444 5050 tel  
510 444 5222 fax

1999 Harrison Street  
Suite 1420  
Oakland, CA 94612

**Salt Lake City, UT**

385 375 8802 tel  
801 335 6544 fax

3006 Highland Drive  
Suite 100  
Orem, UT 84057